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THE TREATMENT OF DISEASES

OF THE

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THE WORK OF THE DIGESTIVE GLANDS.

By Professor PAWLOW, of St. Petersburg.

TRANSLATED INTO ENGLISH BY

W. H. THOMPSON, M.D., M.Ch., F.R.C.S.,

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THE TREATMENT OF DISEASES

OF THE

DIGESTIVE SYSTEM.

BY

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PREFACE.

THIS little book is intended as a Guide to the Principles and Practice of the Treatment of Diseases of the Digestive Organs; it is based on the Author's personal experience, and is offered as a foundation upon which each reader may raise a more imposing superstructure.

ROBERT SAUNDBY.

BIRMINGHAM, *June, 1906.*

70727

CONTENTS.

I. INTRODUCTION.

PAGE

Examination of the Case, ... 1
The Use of the Stomach Tube, ... 14
Massage, ... 17
Electricity, ... 17
Acids, ... 18
Alkalies, ... 20
Digestive Ferments, ... 20
Pre-digested Foods, ... 22
Bitters, ... 23
Anti-Fermentatives and Disinfectants, ... 24
Sedatives and Hypnotics, ... 25
Nutrient Enemata, ... 25
The Influence of the General Mode of Life and of Diet upon the Digestive Organs, ... 26

II. DISEASES OF THE ŒSOPHAGUS.

(*a*) ORGANIC DISEASES, ... 42
Cancer, ... 42
Ulceration, ... 45
Stricture, ... 46
(*b*) FUNCTIONAL DISEASES, ... 48
Neuroses, ... 48

III. DISEASES OF THE STOMACH.

(*a*) ORGANIC DISEASES, ... 50
Acute and Chronic Gastritis, ... 50
Ulcer, ... 55
Cancer, ... 59
Dilatation, ... 61
Hyperchlorhydria, ... 65
(*b*) CONSTITUTIONAL DISEASES, ... 65
Atonic Dyspepsia, ... 65
Phthisical Dyspepsia, ... 67

PAGE

(c) FUNCTIONAL DISEASES, ... 67
Gastralgia, ... 69
Cardiospasm, ... 71
Nervous Vomiting, ... 71
Anorexia, ... 71
Bulimia, ... 72
Akoria, ... 73
Stomach Vertigo, ... 73
(d) INDICATIONS FOR OPERATIVE INTERFERENCE IN DISEASES OF THE STOMACH, ... 74

IV. DISEASES OF THE INTESTINE.

(a) ORGANIC DISEASES, ... 78
Acute and Chronic Catarrh, ... 78, 80
Mucus Colitis, ... 82
Ulceration, ... 83
Typhlitis and Appendicitis, ... 84
Stenosis and Stricture, ... 87
Enteroptosis, ... 88
(b) FUNCTIONAL DISEASES, ... 89
Intestinal Indigestion, ... 89
Colic, ... 89
Meteorism, Flatulence, ... 91
Constipation, ... 91
Nervous Diarrhœa, ... 102
(c) PARASITES, ... 103

V. DISEASES OF THE RECTUM.

Rectal Catarrh, ... 107
Ulceration, ... 107
Cancer, ... 108
Simple Stricture, ... 108
Fissure, ... 108
Polypi, ... 109
Piles and Prolapse, ... 109
Nervous Affections, ... 110

VI. SYMPTOMATIC DISEASES.

Formulæ, ... 123

INDEX, ... 127

DISEASES OF THE DIGESTIVE SYSTEM.

I. INTRODUCTION.

As the cure of disease must depend upon our right conception of its nature and our recognition of its presence

LIST OF ERRATA

Page viii, line 14, *for* "mucus" *read* "mucous."
„ 9, line 12, *for* "1 to 4, 30" *read* "40 per cent, 22·5."
„ 12, line 14, *for* "2 per cent" *read* "1 per cent."
„ 16, line 8 from bottom, *for* "of tannin" *read* "or tannin."
„ 45, line 16 from bottom, omit comma after "taking."
„ 60, line 5, *for* "distension" *read* "dilatation."
„ 74, line 8, *for* "Claustrophia" *read* "Claustrophobia."

operating physician to take every means to clear up in his own mind, so far as may be possible, all doubts as to the actual conditions present, in order that he may clearly recognise the circumstances which justify surgical interference, or which contra-indicate such a proceeding.

The Examination of the Case.

The examination of a supposed case of disease of the digestive system may be divided into three parts—

(1) The history and subjective symptoms to be derived from the patient.
(2) The physical examination.
(3) The chemical and microscopical investigation of stomach contents and excreta.

History and Subjective Examination. — Much of our success depends upon the proper method of questioning the patient, who is often disposed to use the vaguest of terms, to talk about "liver" or "indigestion" or "biliousness," and thinks that this should be quite sufficient information as to the nature of his complaint. It is possible that these words have a definite meaning to the persons who use them, for on enquiry it appears that "indigestion" in most cases means flatulence, "biliousness" vomiting, and "liver" the general physical and mental depression so often associated with disorders of the digestive organs, but we cannot rely upon this, and should always find out exactly what is the condition complained of.

It is of capital importance to ascertain from the patient how long he has been suffering from the symptoms of which he at present complains, and the answer to this should be definite, so as at least to make it clear whether he has been suffering for weeks, months, or years, and, if possible, the duration should be accurately fixed.

Ascertain how the present illness began, if suddenly or gradually, and the symptoms in the order of their appearance, and enquire into the patient's general health and condition at that time, including any opinion he may entertain as to the cause of his illness; for, although this is very often of no direct value, it is never without interest to know to what the patient attributes his condition, and from time to time such a question leads to disclosures of great importance, especially in those very common cases where the breakdown of the digestive system has followed excessive mental or emotional strain.

Ask about the previous health, whether at any time the patient has suffered from a serious illness or accident, and, if so, note its nature and approximate date. In the

case of a female we should note whether she is married or single, the state of the menstrual function, the number of pregnancies and children born alive, with the dates, especially in relation to the onset of the disease.

If the patient complains of pain he must be asked whether it is persistent or temporary? If the latter, whether it comes on at any time or only at certain times? Whether it appears in relation to food, is relieved by food, or excited or increased by it, and, if the latter, whether immediately after food or after what interval? We should also enquire whether there is actual pain or only a sense of weight and oppression, and, if actual pain, whether this is sharp and shooting, or dull and aching, or burning; its situation, as, for example, in the epigastrium, between the shoulder blades or behind the sternum; whether the pain is relieved by anything, and, if so, by what—*e.g.*, by taking food or stimulants, or small doses of carbonate of soda, ginger, or such simple means as people usually try for themselves?

We must ask whether there is vomiting, and, if so, does it occur only in the morning or after food; how soon after; and if after all ingesta or only certain kinds of food? Whether it is followed by pain or relieves the pain? Whether the attacks of vomiting come on periodically, and the appearance of the vomited matter, whether it consists of mucus, food, sour gastric contents, blood, bile, or is dark like coffee, or frothy like yeast?

Lastly, we must enquire into the state of the bowels—Is there a daily movement without medicine? If medicine is used, what is the patient in the habit of taking? If there is diarrhœa, the daily number of stools should be set down.

We should note the patient's general condition. Is there wasting? Determine the body-weight by weighing, and put down what the patient believes to be his normal or maximum weight, with the approximate date at which

he was last weighed. Enquire into sleep, and, if there is a complaint of sleeplessness, find out whether this means that the patient gets to sleep on going to bed but wakes up in an hour or two and has difficulty in getting to sleep again ; or if from the first there is absence of sleep.

We should also note the presence or absence of appetite, thirst, and giddiness, and whether this last has any relation to food or to repose or movement.

Finally, we must enquire into the family history; we can easily ascertain whether the father and mother are alive or dead; if dead, at what ages they died and of what disease. Whether there are any brothers and sisters alive and in good health, or, if any have died, the ages at which they died and the causes of death. If there is any suggestion of hereditary disease the health and causes of death of uncles and aunts on both sides should be ascertained.

The **Physical Examination** of the patient is the chief means by which we determine the presence of the objective signs of disease. The patient should be placed in a recumbent position upon a high flat couch, with the surface of the abdomen exposed; the shoulders and head should be raised so as to relax the abdominal muscles and make the patient more comfortable.

After examining and noticing the condition of the thoracic organs and the urine, we should inspect the interior of the mouth, note any defect in the teeth, the state of the gums, tongue, and lips. By inspection we ascertain the shape of the abdomen, whether convex or concave; the presence of dilated veins, or the so-called "caput medusæ"—the curious ring of dilated veins around the umbilicus often seen in cirrhosis of the liver; we observe any want of symmetry, or the presence of a ventral or umbilical hernia, or visible coils of intestine; and in some emaciated persons we may distinctly see the outline of the stomach, or recognise

peristaltic waves passing across its surface. Sometimes we may find that the severe pain of which complaint has been made is due to nothing more serious than a crop of herpes zoster, although the severity of the suffering may have suggested renal or biliary colic, or even peritonitis. Having noted all that can be made out by this means we next *palpate* the abdomen. There is probably no means of examining the body more fruitful in giving accurate information, when used by a skilled observer; it is, therefore, important to cultivate the art and to pay attention to the rules for its application. The physician stands on that side of the patient which he desires to examine, facing towards the patient's head and on a level with or rather lower than the hip joint; his near hand should be placed flat on the abdomen so as to bring the whole surface of the palm and the palmar aspect of the fingers in contact with the skin, preferably at first in the long axis of the body, and the patient must be asked to breath deeply and slowly. As the muscles relax during expiration he should endeavour to explore with his fingers the underlying viscera. At first the abdominal muscles may be more or less tense, but by continuing to keep the patient breathing deeply this condition, if due to nervousness on the part of the patient, will disappear, and the tips of the fingers will readily detect the outline of any solid body within the abdomen; if the muscles, however, remain rigid, particularly if this rigidity is quite local, there is good ground for suspecting inflammation or peritonitis, the tension of the muscles being due to protective reflex contraction. In this way the edge of the liver, especially if enlarged, can be felt, and we may mark the line on the skin with a dermographic pencil; the spleen, if swollen, can be made out in the same way. Masses of new growth are generally tender and more or less fixed, while fæcal lumps are usually movable, can be

moulded under pressure, and their manipulation causes little or no pain. The position and the mobility of the kidneys can be ascertained in the following manner:—The physician stands on that side of the patient which he wishes to examine, and passes his right hand if on the right side, and his left hand if on the left side, palm upwards, so as to grasp the loin with the fingers, while the thumb makes slight pressure anteriorly; the patient is then told to breathe deeply, and while this is being done the pressure of the thumb should be gradually increased, so that when expiration occurs the kidney, if movable, is forced under the thumb, and may be felt to slip up and down.

In *percussion* we have a further means of examination which, although of infinitely less value than palpation as a means of determining the outline of the abdominal organs, nevertheless enables us to recognise their limits, and to ascertain the presence of fluid, whether contained in the peritoneal cavity in a distended viscus, such as the bladder, or a hydronephrotic kidney, or in a cyst of any kind. The detection of the presence of ascitic fluid is conclusively proved if we find dulness in the flanks, which changes its position when the patient turns upon his side.

The determination of the size and position of the stomach may be made in various ways, but most conveniently by distending it with carbonic acid gas. In order to do this, it is well to be certain that the patient has not taken food for three or four hours. A powder, consisting of 120 grains of bicarbonate of soda, should be dissolved in half a tumbler of water, and given either immediately before or immediately after another powder of 90 grains of tartaric acid dissolved in an equal quantity of water. These powders are larger than those often recommended, but are not too large, do not cause pain or discomfort, and efficiently demonstrate the size and position of the stomach, which

smaller powders may fail to do. In thin persons the distended stomach may be distinctly visible, and, if displaced, the position of the small as well as the large curvature may be seen; but in stout persons the position of the organ, even when distended, may be only made out by a combination of palpation and percussion. When the patient stands up the gas is readily returned, and there are no unpleasant after-effects; in fact, where there is gastritis the stomach is often unusually comfortable for several hours after. Such distension renders the stomach more accessible to palpation, and the absence of a pyloric tumour may be affirmed with greater certainty. This means of distension, or indeed any other, should not be used where there has been recent hæmatemesis.

Of the three stomach functions—*Secretion*, *Absorption*, and *Motility*—the last is infinitely the most important; for it is certain that many persons whose stomachs fail to secrete a sufficient supply of gastric juice do not suffer from any symptoms, while absorption from the stomach takes place to a very small extent; but, on the other hand, where the stomach's motor functions are diminished there is always discomfort, and easy digestion may be taken to mean free and rapid emptying of the stomach contents into the duodenum. It is, therefore, of great practical importance in cases of digestive trouble to ascertain how far the motor function of the stomach is interfered with, and this can only be done satisfactorily by examining the state of the stomach by means of the tube. The presence of food in the stomach twelve hours after a meal indicates serious pyloric obstruction; after eight hours there may be slight pyloric obstruction, but after less than eight hours the presence of food merely indicates such impairment of the motor activity as may be caused by atonic dilatation without obstruction. Any stomach contents removed by the tube should be set

aside for chemical and microscopical examination. The examination of the fasting stomach is generally made in the morning before the administration of the test breakfast and twelve hours after a supper with which a few currants have been taken, as fragments of their skins are readily identified.

The **Chemical and Microscopical Examination of the Stomach Contents,** vomited matter and fæces, as an aid to the diagnosis of diseases of the digestive system, has been much elaborated of late years; but I shall only describe those methods which are required to determine points of practical importance. The necessary apparatus is not costly or complicated, and the chemical and microscopical manipulations call for no more skill than can be readily acquired with a little practice.

List of Apparatus.

Stomach tube, having two large lateral openings near the end with smoothed edges.
A yard or two of indiarubber tubing.
A large glass funnel.
Two enamel or porcelain bowls.
A burette and stand.
Two or three porcelain capsules.
A spirit lamp.
Litmus paper.
Congo paper.
Fehling's solution, 4 ozs.
Uffelmann's reagent (Liq. ferri perchlor., 8 min.; carbolic solution, 1 per cent.), 6 ozs.
Guensberg's reagent (phloroglucin, 2; vanillin, 1; alcohol, 30), 2 drs.
Lugol's solution (iodine, 3 grains; potass. iod., 6 grains; water, 6 ozs.).

Phenolphthalein solution (1 per cent.), 1 oz.
Dimethyl-amido-azo-benzol, alcohol solution ($\frac{1}{2}$ per cent.), 1 oz.
Pepsine (must be of good quality and free from peptone).
Hydrochloric acid (2 per cent.), 2 ozs.
Incubator (Martindale's pocket incubator will answer the purpose).
A good microscope (Zeiss or Leitz, with a $\frac{1}{12}$ oil immersion lens).
A ureameter (Gerrard's).
Sodium hypobromite solution (bromine, supplied in glass capsules, 2·5 c.c.; sodium hydrate, 1 to 4, 30 c.c.), 10 ozs.

The object of a *test meal* is to determine the activity of the gastric juice by giving a definite quantity of food and withdrawing it after a fixed time in order to ascertain how far the normal digestive action has been effected. There are various test meals in use, but that most commonly used is known as Ewald's test breakfast, and consists of $1\frac{1}{2}$ ozs. of bread or toast and $\frac{3}{4}$ of a pint of weak tea without milk or sugar. This meal contains sufficient starch and proteid to test the activity of the saliva and gastric juice. The chief objection made to it is that, as it is rather insipid, it does not stimulate the flow of gastric juice so much as a more appetising meal would, but experience has shown that its results are sufficient, and it furnishes gastric contents which are comparatively inoffensive and easy to manipulate. A more serious fault is that, as the bread contains a little lactic acid, it cannot be used to determine the presence of this acid, which is held by some authorities to indicate carcinoma, but few rely upon this point alone, although the absence of lactic acid would militate strongly against the diagnosis of cancer; for this purpose a meal of oatmeal gruel made with water may be substituted. It has been

found by numerous observations that Ewald's test meal is, under normal conditions, saturated by the gastric juice at the end of one hour, at which time free hydrochloric acid is present; therefore the mode of administration is to give the meal at, say, 8 a.m., and at 9 a.m. precisely to pass a stomach tube and remove the contents by getting the patient to compress the abdominal muscles, or we may aid him by making pressure with the hands upon the epigastrium, or we may use a stomach tube with a bulb on it, which draws up the gastric contents if the distal part of the tube is pinched. There is, as a rule, no difficulty in obtaining a sufficient quantity for the purpose of examination, but it is sometimes necessary to pour in a small quantity of water by a funnel and then withdraw the washings. If this is done, the result obviously can be of no value for a quantitative examination of the stomach acidity.

The extracted contents should be set to filter, and, while this is taking place, we may look under the microscope for unaltered starch granules, a drop of Lugol's solution being added to bring these out more clearly. They may also be examined for the presence of any abnormal elements, such as blood-corpuscles, pus, and epithelial cells, fragments of growth, or the large Boas-Oppler bacillus met with at times in cancer of the stomach.

The filtered stomach contents must be examined for (*a*) free hydrochloric acid, (*b*) lactic acid, (*c*) butyric acid, (*d*) albumose, (*e*) peptone, (*f*) sugar, (*g*) erythrodextrin, and (*h*) rennet ferment.

The presence of **free hydrochloric acid** may be ascertained by testing with Congo paper, which is turned, in its presence, from red to blue, or more certainly by heating a few drops of the fluid with a drop of Guensburg's reagent in a porcelain capsule, when a rose-red streak announces the presence of the free acid.

Albumose is demonstrated by the biuret reaction, the pink colour given with dilute Fehling's solution in the cold. In order to show the presence of peptone the albumose must be precipitated by saturating with ammonium sulphate and filtering, after which, if the reaction still appears, the presence of peptone may be affirmed; but there is no need to do this, as a rule, the presence of albumose being sufficient evidence of peptic activity.

The presence of **sugar** is shown by boiling with Fehling's solution, while **erythrodextrin** is detected by the filtered stomach contents giving a brown colour with Lugol's solution.

Gastric juice normally contains a **milk-coagulating ferment**; but this is said to be absent in cancer of the stomach. The value of this sign has yet to be determined, but it is easy to settle whether the ferment is present or not. Equal quantities of milk are placed in two test tubes, and to one of these a few drops of the stomach contents are added; both are then carefully neutralised by bicarbonate of soda, and placed in an incubator for fifteen minutes; if rennet ferment is present the test tube to which the stomach contents were added will be coagulated, while the milk in the other tube will be unchanged.

The presence of **lactic acid** is detected by means of Uffelmann's reagent, which has a faint amethyst blue colour; lactic acid changes this colour to a canary yellow; **butyric acid** to a deeper yellow; and **acetic acid** to a reddish hue.

It is further desirable to analyse the **activity of the gastric juice** by separate digestive experiments. For this purpose we use white of egg boiled hard, punched out into little cylinders, and sliced into discs about one-twentieth of an inch in thickness. Three or four of these discs are placed in each of four test tubes; to the first is added the plain gastric contents; to the second the gastric contents *plus* a drop or two of 2 per cent. solution of hydrochloric

acid; to the third, gastric contents *plus* a few grains of an active preparation of pepsin, which should be previously examined to ascertain that it is not only active but also free from albumose and peptone; to the fourth the pepsine and hydrochloric acid, used in these experiments, and a little water, in order to test their digestive activity. All four test tubes are placed in an incubator and left there for four hours, at the end of which time they are examined for albumose and peptone, and the results recorded.

When it is thought desirable to *ascertain the total acidity* of the gastric juice, this may be done by employing a decinormal solution of sodium hydrate, which must be run through a burette into a capsule containing 5 c.c. of gastric contents, to which two or three drops of a 2 per cent. solution of phenolphthalein have been added; the alkali should be added drop by drop until the neutralisation of the acid is shown by the appearance of a tinge of red. If we desire to *estimate the amount of free HCl only*, the procedure is the same, but dimethylamidoazobenzol solution must replace the phenolphthalein, and the end-reaction is an orange colour. The quantities of acid are usually expressed by the number of c.c. of sodium hydrate solution needed to saturate the gastric contents.

The **examination of the fæces** is made (*a*) by inspection, which enables us to recognise the size and consistence of the dejecta, the presence or absence of bile, mucus, blood, undigested food, lumps of fat, calculi, concretions and parasites; (*b*) by noting the reaction with litmus paper, normal stools being neutral, so that a distinctly acid or alkaline reaction calls for attention; (*c*) by microscopical examination, which may reveal pus, blood, fat, crystals, undigested starch, and other elements of food; (*d*) by chemical examination, which promises to be of service, but so far has been little practised in this country.

The two most important points to be determined chemically are the *presence of blood and of fat.* For the detection of **blood** in fæces, when the naked eye and the microscope fail, Boas recommends the following plan:—5 to 10 c.c. of fæces (which must be liquid and, if necessary, diluted with water) are shaken up with 20 c.c. of ether to remove the fat; then treated with 3 to 5 c.c. of glacial acetic acid; and again extracted with ether. To the ethereal extract a fragment of guaiacum is added, and then 20 to 30 drops of French oil of turpentine. Instead of the guaiacum a fresh solution of aloin may be used. This is made by taking as much aloin as will go on the point of a spatula, and dissolving it in 3 to 5 c.c. of 60 to 70 per cent. alcohol. To the acetic acid extract are added first 20 to 30 drops of French oil of turpentine, and then 10 to 15 drops of the freshly prepared aloin solution. In the presence of blood a bright red colour is developed which, on standing, turns to cherry red. This reaction is hastened by the addition of a few drops of chloroform, which sinks to the bottom, forming an intense vermilion precipitate. Ozonic ether may replace turpentine with either method.

The chemical proceedings required to determine the presence of **fat** are more complicated. A certain quantity of fæces must be dried, weighed, and triturated in a mortar with powdered glass and sand which has been well washed with HCl and water and dried. This is extracted by ether to which HCl has been added, by which all the fats, including cholesterin and lecithin, are removed, when the weight of these can be easily obtained. For the qualitative analysis the triturated matter is extracted with ether, dried, weighed, and redissolved in ether, then treated with water to dissolve the alkaline soaps, which can be separated by decantation, and precipitated by chloride of barium as barium soaps. The fatty acids are estimated by

an alcoholic solution of potash (1 to 10) in presence of phenolphthalein, 1 c.c. of this solution saturating 0·0284 of stearic acid; the quantity of neutral fats is the difference, after the soaps and fatty acids are subtracted from the total.

Dr. René Gaultier is of opinion that the fæces should be examined after a test meal of known composition, which should be delimited by giving a capsule of carmine before and afterwards. So far we have not had sufficient experience of his methods to judge of their value.

The Use of the Stomach Tube.

Stomach Washing — Lavage.— The modern stomach tube of soft rubber was introduced by Kussmaul in 1867. The form now preferred is 30 to 36 inches long with tolerably thick walls and two lateral openings near the lower end, the edges of which openings should be made smooth, as, if sharp, they may lacerate the mucous membrane; this may easily be done by rubbing with a glass rod or sewing needle warmed in the flame of a spirit lamp. It is convenient if the tube is marked by a small vulcanite ring or a band of white paint 16 inches from the lower end, which is the distance of the cardiac opening of the stomach from the incisor teeth. Some tubes are provided with a rubber bulb and funnel attachment.

Such a tube is readily passed into the stomach; the patient should sit in an upright position, with the head bent forward, and the operator, standing behind or on the right side, passes the tube into the pharynx, guiding it h his forefinger. He should then direct the patient to llow and, at the same time, gently push on the tube, n, as a rule, it will pass into the stomach without any h. It is unnecessary to lubricate the tube, but it

should be dipped into boiling water or boiled before being used so as to ensure its being clean. No gag is necessary, but any false teeth had better be removed before the operation is begun. Patients readily learn to pass the tube for themselves.

If the tube is passed merely for the purpose of withdrawing the stomach contents, these may be received in a basin or glass when the patient makes expulsive efforts by compressing his abdominal muscles; but, if it is desired to wash the stomach out, a piece of indiarubber tubing, about a yard and a half long, must be connected with the stomach tube by means of a short length of glass tube and into the other end of the indiarubber tube a large-sized glass funnel should be fitted, through which the fluid (usually warm water at a temperature of 90° to 95° F.) is slowly poured, the rate of flow being regulated by raising or lowering the funnel; when sufficient fluid has been introduced a syphon action is induced by merely lowering the funnel to the level of the floor when the fluid flows back into any receptacle placed to receive it. This operation should be repeated as often as necessary to wash out the stomach thoroughly.

After the introduction of the stomach tube into medical practice, it came to be regarded, particularly in Germany, as a *panacea* for all forms of chronic dyspepsia, but this delusion has passed away, and now a more rational view is taken of its utility. The following may be given as the conditions under which the stomach tube may be used:—(*a*) To empty the stomach of injurious contents, such as poisons, excess of alcohol, or irritating articles of food, although in the last case the stomach may be as easily emptied by drinking hot water and tickling the back of the pharynx; (*b*) to ascertain the presence, or absence, of stasis of food in the stomach, and to withdraw test meals;

(*c*) to wash out the stomach in dilatation where there is food stasis and secondary fermentation, but such cases may nowadays be cured by surgical means; (*d*) to relieve cases of excessive secretion of gastric juice or mucus; (*e*) for artificial feeding in lunatics and hysterical patients; and (*f*) for intraventricular electrisation—for this purpose a special tube carrying an electrode is employed, and its utility will be discussed under a special heading (see *Electricity*).

The **contra-indications for the use of the stomach tube** are recent hæmorrhage from the stomach; speaking generally, the presence of either ulcer or cancer of the stomach; the presence of severe heart disease; thoracic aneurism; a liability to apoplexy or to epileptic or hysterical fits.

Various methods of washing or spraying the inside of the stomach have developed out of the stomach tube, chiefly of American invention. These are the intragastric spray and the intragastric needle douche. In the former, only a small quantity of fluid is used after the stomach has been washed out. The solutions used for the spray are 1 to 500 or 1 to 1,000 of nitrate of silver, 1 to 250 of cocaine, and 1 to 1,000 of hydrochloric acid. On the other hand, the needle douche is worked by water under considerable pressure, and large quantities are used in ordinary lavage. The stomach is douched with hot and cold water alternately, or with solutions of common salt of tannin ($\frac{1}{2}$ per cent.), or sulpho-carbolate of zinc (1 gr. to the oz.), or permanganate of potash (1 to 5,000), or quarter-strength infusions of gentian or quassia. One of the quaintest inventions is that called Turck's gyromele, which has on the end a sponge, rotated on the same principle as a dentist's drill, and is said to be used for removing adherent mucus from the stomach! There is nothing new under the sun, for

Ewald in his *Lectures on Diseases of the Stomach* quotes from Rumsæus (1659), who invented a stomach brush to remove mucus from the stomach, "so that in those times there was not a beer-drinking association of which some members did not use it in the evening when they had drunk too much or else when, next morning, lying with open mouths they were inconvenienced by the accumulation of mucus in their throats."

Massage.—There can be no doubt of the great value of general massage in the treatment of stomach diseases, in order to maintain general muscular tone during the often prolonged periods the patient is obliged to remain in bed. I make it a rule, whenever it is possible, to order general massage for all my stomach cases so long as they are in bed.

Local massage, on the other hand, applied to the abdomen, especially over the region of the stomach, is of more doubtful value, and in many cases may do more harm than good. It is obviously unsuitable to cases of ulceration wherever situated, and should never be employed where it causes pain and discomfort, as it may do when inflammation or spasm is present. In all cases abdominal massage should be applied cautiously and gently, for it is not uncommon to see cases of atonic constipation become spasmodic, and such a transformation might be brought about by, and would certainly be attributed to, massage if this had been employed energetically.

Electricity.—The Faradic current is often used together with massage in the general treatment of cases of atonic dyspepsia, and in some cases benefit may be derived from its special application to the abdominal muscles; in other cases patients express themselves as relieved by the galvanic current when a large flat electrode is applied over the region of the stomach. Currents of *high frequency*

have also been employed of late in the treatment of the same class of case, but I have seen no definite good from this treatment.

The *intragastric* application of electricity has been possible since the invention of Einhorn's electrode, which is a small perforated vulcanite bulb carried at the end of a rubber tube through which runs a wire connected with a metal button in the interior of the bulb. This has been modified in various ways and is passed like a stomach tube. Before passing this electrode the patient should drink a large tumblerful of water to act as a medium for carrying the current from the bulb to the stomach wall. The other pole of the battery may be applied to any part of the patient's body, but usually a large flat electrode is placed on the abdomen. With these electrodes any kind of current may be applied, but usually a weak constant current (5 to 6 milliamperes) has been used with slow interruptions.

Electrical treatment of stomach diseases has not in my experience proved a success and does not repay the amount of time devoted to it. Such benefit as has been derived from it in any case that I have seen might quite well have been due to the effect of suggestion.

Acids.—The value of acids in the treatment of dyspepsia has been known for many years, but received marked support from the discovery of the chemical action of the gastric juice and the part played therein by hydrochloric acid. Trousseau relates how he was induced to try the effects of small doses of hydrochloric acid taken after meals by a chance acquaintance at a restaurant, who had found from experience that by its use he was able to strengthen his digestion which had become weakened in the course of a wandering life by frequent changes of diet. Long before this it was used in England, but the indications for giving

it were not very precise and even now are conflicting. It is undoubtedly often beneficial, but also not uncommonly it does harm, and it is imprudent to begin with acids without giving a preliminary course of bismuth and alkalies. The theoretical ground for giving acid is often alleged to be that it aids the action of pepsin, but the quantity we are able to give is not sufficient to contribute in an important manner towards this end. It is common to find hydrochloric acid deficient where pepsin is formed in sufficient quantities, and in these cases, if it were possible to give a sufficiently large amount of hydrochloric acid, digestion would be thereby improved, but the quantity required would be from 2 to 3 drms. of the dilute acid of the Pharmacopœia; and although some German practitioners have tried to administer it by means of the stomach tube, or have ordered doses to be taken every twenty minutes for two hours after meals, I do not regard either of these as a practical suggestion. It is, therefore, doubtful whether the good effect of the acid is due to its supplying the deficiency of the natural secretion. Another reason for doubting this is that equally good effects to those seen from hydrochloric acid are alleged to follow the use of sulphuric acid (Robin), nitric acid, and nitrohydrochloric acid; moreover, it is certainly not uncommon for practitioners to recommend it to be taken before meals. When so given it may act as a stimulant to determine the flow of gastric juice, and thereby aid digestion, in the same way as bitters and other so-called peptogens, but if given when the stomach is inflamed it may aggravate instead of relieving the trouble complained of. The experiments of Starling on the effects of the acid gastric contents on the mechanism of the pylorus and the flow of pancreatic juice suggest an explanation of the good results of giving the acid after meals, namely—that the quantity given may

be enough to raise the acidity sufficiently to open the pylorus and stimulate the flow of pancreatic juice, in this way relieving the stomach of its burden, which is of special importance in atony of the stomach, and promoting intestinal digestion by which the gastric defects are compensated and nutrition maintained. Experience of the acid treatment in atonic dyspepsia for many years has convinced me of its value and this explanation may account for results which are not to be doubted.

Alkalies.—The value of alkalies in the treatment of stomach disorders is abundantly attested by the great popularity of innumerable alkaline mineral waters in gastric diseases. No doubt they act by neutralising excess of acid, whether secreted by the gastric glands or formed by abnormal fermentations, but it is probable that their effect is not solely this. Pawlow believes that small doses of alkalies inhibit the secretion of the gastric glands, and, if this be true, we can easily understand their value in those irritable conditions of the stomach in which there is a tendency to secrete an excess of juice. Alkalies also are useful from their power of dissolving mucus and thereby aiding its removal from the stomach. Where alkaline carbonates are used, the carbonic acid gas which is given off has an anæsthetic effect upon the gastric mucous membrane, and produces a grateful sense of coolness in an irritated or inflamed stomach. Bicarbonate of soda given in combination with rhubarb and bismuth is perhaps more commonly administered than any other drug in the treatment of stomach disorders, and deserves the reputation it has gained. It may also be given in the form of mineral water; the waters of Vichy, Vals, Châtel Guyon, Neuenahr, Fachingen, Ems, and Royât owe their value in the treatment of gastric disorders mainly to this salt.

The Digestive Ferments.—Our knowledge of the part

played by the various digestive ferments in digestion has suggested their employment in the treatment of disease, either by preparing pre-digested food or by administering them with, or after, food in those cases in which they are supposed to be deficient.

The salivary ferment, **ptyalin**, is probably only deficient in cases of grave general disorders, such as fevers, and is always present in merely local stomach affections. It may be absent in some rare cases of "dry-mouth" of nervous origin, but this is a very uncommon condition. The practical difficulty in the digestion of starch occurs, not from any want of salivary ferment, but from the too rapid secretion of a large quantity of acid gastric juice, which checks the action of the saliva on the food after it has reached the stomach, and in such cases the examination of the stomach contents shows that there is a large amount of unchanged starch, with deficient formation of sugar and erythrodextrin. Therefore there is not often any indication for supplying deficient salivary ferment, for which various means have been placed at our disposal. These means include many kinds of malted food, which are predigested preparations, pancreatin, and taka-diastase, containing amylolytic ferments, directed to be mixed with the food or given immediately after it; but these ferments are inhibited by the presence of acids, so that their action in the stomach is subject to the same limitations as those of ptyalin.

Pepsin is very rarely absent from the stomach contents, and, when it is, hydrochloric acid is absent also. In 141 cases it was only absent in 4, in all of which hydrochloric acid was absent also. Therefore the administration of pepsin is seldom indicated, and where, by its absence, this might seem to be justified, the impossibility of supplying a sufficient quantity of hydrochloric acid (*vide supra*, Acids),

makes it useless. Pawlow has suggested a preparation of gastric juice derived from living dogs, which is said to be four times as strong as human gastric juice. This is now sold on the Continent under the name of gasterine, but is said to be very expensive, and would certainly have to be taken in considerable quantities to prove effectual. Pepsin is used in artificial digestion experiments, and needs to be constantly tested, as it is often inert; it is also frequently mixed with albumose and peptone, so that care must be taken to avoid this source of fallacy in estimating the activity of stomach contents. In cases of deficient hydrochloric acid, **pancreatin** may be given, but it will only work if the stomach contents are actually alkaline, and, although hydrochloric acid may be deficient, acids of some kind are usually present in sufficient quantities to interfere with its action.

Papain, a remarkably active digestive agent derived from the juice of *Carica papaya,* acts indifferently in the presence of acids or alkalies, but does not long retain its digestive power, so that it becomes inert and cannot be relied upon when dispensed by the chemist.

Pre-digested Foods.—There are in the market many articles of food which have been subjected to processes by which the chemical changes of digestion have been more or less completely imitated, and these are advertised as of special value in the treatment of diseases of the digestive organs.

In the first place, there is a large series of starchy foods more or less converted into **dextrine** and **malt sugar.** As already pointed out, in diseases of the digestive system deficient salivary diastase is so rare as to be practically unknown, but where, owing to irritability of the stomach and to rapid secretion of gastric juice, the opportunity for the action of the saliva upon starch is cut short after the

food reaches the stomach, the use of such preparations is indicated. The best known are Benger's and Mellin's food, and the various malt extracts. The last are also indicated where there is great intolerance of cane sugar, as is not uncommon in children, and may be used for sweetening where cane sugar disagrees. Hoff's malt extract is really a kind of stout, and must not be confounded with the preparations of malt sugar which usually go by that name in this country.

Peptonised or pancreatised albuminous food has also been prepared, but is less successful as it is difficult to prepare, and loses its naturally agreeable flavour, as all peptones are bitter. These foods are also expensive, and none of them has proved quite successful.

There has been no recent attempt to provide fats in other than their natural condition, but some years ago Savory & Moore's pancreatic emulsion was largely used. It is a preparation of lard pounded up with fresh pancreas, melted, strained, and flavoured agreeably. Patients take it very well, and it seems to be assimilated easily, so that it does not deserve to be altogether forgotten.

Bitters.—The reputation possessed by various bitter drugs as digestive stimulants rests upon popular belief rather than upon scientific evidence, although a considerable number of experiments have been made in order to clear up the question. Pawlow holds that they act by stimulating the nerves of taste, and thus by reflex action assist the activity of the gastric glands. Quassia, gentian, calumba, cinchona, and condurango are all employed for this purpose. Litten speaks highly of the carbonate of berberine, an alkaloid found in calumba and hydrastis, but principally obtained from the bark of the common barberry. Penzoldt recommends 5-grain doses of orexin tannate given in cachets, but if these are active the above explanation

given by Pawlow cannot hold good in the case of this drug.

Anti-Fermentatives and Disinfectants.—The revolution effected in surgery by the so-called antiseptic system is responsible for the exaggerated estimate of the value of anti-fermentative and disinfectant drugs, but for this the eminent discoverer of that system is in no sense responsible. Lord Lister used antiseptics, not to correct putrefaction, but to prevent it; and he always taught how extremely difficult, if not impossible, it is to get rid of putrefactive organisms when once these have established themselves, even where it is possible to use strong solutions of powerful antiseptics applied to a limited area. There never was in the antiseptic system of surgery any proper ground for the belief that by the administration by the mouth of a few grains of a so-called antiseptic it would be possible to disinfect the stomach or intestines, and all such proceedings are absolutely futile. Fermentation and putrefaction in the stomach and intestine are favoured by stasis of their contents; any means which lead to the evacuation of their contents check these fermentative processes, and all those remedies which appear to relieve symptoms depending upon fermentation, if they are effectual, act by stimulating peristalsis, and not by any action they can exert over the development and growth of putrefactive organisms. On the other hand, almost all antiseptic drugs are irritating to the gastro-intestinal mucous membrane, and in inflammatory conditions are liable to do harm. The milder preparations of mercury, especially blue pill and calomel, are unquestionably the best of all the remedies which come into this category. Calomel may be given in relatively large doses; it is antiseptic, and also stimulates intestinal peristalsis, but blue pill generally needs to be combined with an aperient, so that the usual practice

is to give a blue pill at night and a saline aperient in the morning.

Sedatives and Hypnotics.—Pain in the stomach should not generally be treated by the use of sedative drugs, but where the pain is severe, and it may be excruciating, particularly in some nervous affections, no remedy seems able to take the place of morphia; but there are many objections to the continued use of opium, or of any of its preparations, as they depress the digestive functions and cause constipation, besides running the risk of setting up the opium habit. It is, however, rare to find any serious difficulty in dealing with ordinary stomach pain, which usually disappears when the patients are put to bed and given suitable diet; even in nervous affections rest is the most powerful remedy. I have not obtained good results from chloral hydrate, or any of the coal-tar series of analgesic remedies, which are so useful in neuralgias of the head and face.

With regard to **hypnotics,** where sleeplessness is due to stomach affections, the appropriate treatment for these is the best remedy for the sleeplessness, but in certain nervous conditions, where sleeplessness is only associated with stomach trouble, the want of sleep may aggravate the nervous condition, and in that way become indirectly a cause of the stomach trouble, it becomes important to give the patient sleep by any means in our power. For this purpose the remedies which act best and cause least disturbance are trional, veronal, and sulphonal. I have had a longer experience with trional than with veronal, and have obtained excellent results with it in small doses of 10 to 15 grains; the dose of veronal is 7 grains. The most convenient form for giving these drugs is in compressed tablets which can be swallowed like pills.

Nutrient Enemata.—Rectal feeding is often necessary

temporarily in the treatment of diseases of the stomach, and for a time it is possible by this means to maintain nutrition, but it is rarely necessary for longer than forty-eight hours, and should never be relied upon as a sole means of feeding for more than ten days. Absorption seems to go on fairly well from the rectum, and it does not appear necessary to predigest the albumen, but the addition of a little common salt facilitates absorption. As there can be no question of taste there need be no variety in nutrient enemata, and the simplest and best constituents are raw eggs beaten up and mixed with milk, which may be peptonised at a temperature of 90° to 95° F. The quantity should not be large, as the enema is then more difficult to retain, and should not exceed 6 ozs. The enema I have employed for many years is one egg beaten up with milk to make 6 ozs. and a teaspoonful of common salt. The rectum should be washed out the first thing in the morning by a simple enema of warm water and soap, and not less than an hour afterwards the first nutrient enema should be given. They should be repeated every four hours while the patient is awake. In order to favour the retention of the enema the hips should be elevated, the patient lying on the left side, and a folded towel should be pressed against the anus for twenty minutes to half an hour after the injection.

The Influence of the General Mode of Life and of Diet upon the Digestive Organs.

Unquestionably the vast majority of diseases of the digestive organs are induced by faulty habits or improper diet, and we may take it that children are born into this world in most instances with healthy digestive organs. It is, therefore, of great importance for the future well-being of the individual that during infancy there should be no

digestive troubles, such as so often occur in artificially-fed infants, which probably form the foundation of life-long digestive troubles. Wherever possible infants should be fed upon their mother's milk, and the medical profession should do its utmost to discourage artificial feeding. It is to be feared that the establishment by municipalities of departments to supply sterilised milk will tend rather to discourage maternal nursing among the poor by offering a false security from the danger of less carefully prepared artificial foods.

During childhood and throughout the school age there should be abundance of fresh air and exercise, and the care of the skin by frequent baths and of the teeth by the daily use of the tooth-brush should be taught not only in the family but in the school. In Sweden and Norway there are baths attached to all the public elementary schools, where the children are made to wash their bodies at least once a week. The brain must not be overtaxed at school, and parents need reminding that they favour this result by expecting too much in too short a time. A boy who is going into a profession should be left at school until he is eighteen and his parents ought to be satisfied if at the end of that time he has acquired sufficient general knowledge to pass the entrance examination. His mind is then more mature and he will reap more advantage from his professional teaching than if he had commenced at an earlier age. The value of games is sufficiently appreciated to need no special emphasis.

Food should be plain but sufficient; it is most important that meals should be taken at regular times; three meals a day seem to be the natural arrangement, and intermediate meals should be discouraged. Meals must not be hurried, because, in the first place, it is most important to *masticate* the food properly; and, in the second place, digestion being

very much under the influence of the emotions, requires a quiet mind, and is inhibited by the sense of hurry. Food cannot be properly masticated without good teeth, and if these have been lost artificial teeth must be obtained. It is to be regretted that these are often obtained more for show than for use, consequently the front teeth only are replaced, but when molars are supplied they are not always good for mastication, dentistry seeming to lag behind in the important art of furnishing really efficient masticating teeth.

As comfortable digestion depends above all upon the unretarded passage of the food from the stomach into the bowel, any sluggish action of the bowel, as a whole, is liable to interfere with this important function; therefore a healthy habit of body should be carefully cultivated, and habitual *constipation* vigorously opposed by all proper means. Probably regular daily walking or riding exercise is the best means conducive to this end. Dry diet favours constipation, and many women drink too little fluid. A definite amount of fluid, not less than two pints, should be taken daily not necessarily at meals, but if, when taken with food, it hinders digestion and causes discomfort, it may be taken on rising, between meals, and before going to bed. It is well also to take a certain amount of fruit and green vegetables daily, but these must be cooked if there is any tendency to stomach irritation. Should these measures prove insufficient, or be for any reason impracticable, the best remedy is to take a small teaspoonful of sulphate of soda in half a tumbler of water, which may be hot or cold as preferred, on first rising in the morning, or a wineglassful of any aperient mineral water, of which Rubinat is the best. But saline aperients are not well borne by delicate people whose constipation may be a difficult matter to treat (see *Constipation*).

Food should be taken neither too *hot* nor too *cold;* perhaps the former error is not common, but some women are fond of drinking tea as hot as they can bear it. Too cold food is not commonly taken in this country, but from time to time we see the evil effects of iced cream taken on an empty stomach; both iced cream and iced water reduce the temperature of the stomach below that at which digestion goes on most favourably and to some extent retard this process.

Sleep is not, as a rule, to be encouraged after meals as it slows peristalsis. Gentle exercise is rather to be recommended, but rest in a recumbent position is beneficial in cases of atonic dilatation and in incurable organic disease of the stomach.

The use of **tobacco** in moderation does not appear to affect digestion, but in excess it causes gastritis, as the result of swallowing saliva saturated with the products of imperfect combustion. The evil effects of tobacco on the stomach are perhaps more often noticed in Germany than in England, as they are mentioned more frequently in German medical books.

The influence of **tea-drinking** as a factor in the causation of stomach diseases has been exaggerated. It is curious to notice that in Germany coffee takes the place of tea-drinking in the alleged causation of dyspepsia, and tea is recommended as a substitute for coffee to sufferers from stomach disorders. The bad effects of tea, such as they are, are due to the tannin which it contains, and are in direct proportion to the amount of this irritant; consequently China tea, which contains only 3 per cent. of tannin, is to be preferred to the teas of India and Ceylon, which contain from 7 to 8 per cent., at any rate for persons who have irritable stomachs. A pleasant way of giving tea to dyspeptic patients who do not wish to be altogether deprived of it is to order the tea to be infused with boiling

milk instead of boiling water. This method probably extracts most of the tannin, which combines with the casein of the milk and remains in the infuser. It is a mistake to suppose that, by rapid infusion with water, tannin is not extracted, as its solubility is so great that, even if the infusion is poured off at once, it will be found to have extracted practically the whole of the tannin; the additional bitterness noticed in tea which has stood for a long time is due to bitter extractive principles and not to the increased amount of tannin.

Coffee, as used in this country, is, as a rule, without ill effects on the digestion; it should be made very strong, and if taken with a meal, as at breakfast, should be diluted with at least an equal quantity of milk, but, if taken as black coffee after a meal, only one small cup should be drunk. This small cup of black coffee, so taken, has the effect of stimulating stomach movement and accelerating the discharge of the food into the duodenum, an effect which is accompanied by sensible relief to many persons.

That there is a personal idiosyncrasy to tea and coffee appears to be evident. The influence of coffee in causing insomnia is, of course, too well known to need insisting upon. An old medical practitioner suffered from cramp in the calves of the legs in bed, and traced it to the use of coffee at night, as he lost the complaint when he discontinued the habit and suffered again when he resumed it; another patient thought that coffee made him thirsty and constipated; a third, that it caused him to be irritable and nervous; while a fourth complained of burning and swelling of the hands and legs after its use. I have met with a case of sweating of the palms of the hands and the soles of the feet after coffee, and a recent note in the *British Medical Journal* contains a complaint from a member who suffers from excessive perspiration of the hands, particularly when

tea or coffee has been taken. Dr. Bridgwater has recorded, in the *New York Medical Record*, two cases of *Pruritus ani* cured by abstinence from coffee, and he refers to a case, reported by another observer in the same paper a year previously, from which he got the hint which induced him to give the successful advice. Dupuy has observed the frequent occurrence of impotence in those who drink large quantities of strong coffee—five or six glasses daily—and marked improvement on abstinence from it. With regard to tea, a letter from a distinguished member of the medical profession says:—"Tea spoiled the twenty best years of my life before I found it out. It gave me awful pain, almost anginiform, with sense of palsy and weakness of limbs and a grey face, but there was no obvious change of the radial pulse." A physician told him that it was either tea or coffee, and he has been well for eight years since he left off both. The letter adds that he has recently seen a patient in comfortable circumstances who had an intermittent and irregular heart until advised to drop tea, and who is now, at the end of five weeks, about recovered. Since he made out his own case he has seen "scores of such cases among the well-to-do as well as the poor," and he considers that tea is "a horrible poison to some people."

The use of liqueurs after meals is justified by their also acting as stimulants to the muscular wall of the stomach; but they are not so innocent as coffee, as they have a more directly irritating effect upon the stomach, and are also attended by the special dangers attaching to all strong alcoholic drinks.

Alcohol taken with meals retards digestion, but if well diluted does so to a scarcely appreciable extent, and this may be counterbalanced by its promoting appetite and increasing the relish for food, which have been shown to

have so much to do with stimulating the secretion of gastric juice. Effervescing drinks, including champagne, favour digestion, and a little light wine diluted with effervescing mineral water is a perfectly wholesome drink. Both beer and wine, if taken in excess, may retard digestion and become causes of gastritis, but in small quantities they rarely do this, and if they disagree it is more likely on account of their acidity than of the alcohol they contain. Beer brewed after the German fashion, in which fermentation has been checked early, contains less alcohol and less acid than English beer, and is, consequently, to be preferred from a hygienic point of view. So far, English brewers do not seem to have succeeded in placing upon the market a beer at all comparable in these essential qualities to that brewed on the Continent.

The popular belief in the wholesomeness of *whisky*, fostered as it is, unfortunately in some instances, by medical prescription, is entirely without foundation so far as the stomach is concerned. Whisky is free from acid, and is therefore not likely to cause the special troubles that arise from acidity, but it is an irritant, and in cases of gastritis keeps up the inflammatory trouble, particularly when taken upon an empty stomach, and retards, if it does not prevent, recovery.

Saccharine (Glucusimide), a derivative of toluene, is largely used as a substitute for sugar, not only under medical prescription, but also by numerous persons who fancy that by so doing they are counteracting a tendency to obesity or gout. It is sold in small tablets made up with a little bicarbonate of soda, which renders it more soluble, and such a tablet is regarded as equivalent to a good-sized lump of sugar. This substance has been now in use for about fifteen years, and experience of it shows that it is harmless in the doses usually taken; it is sometimes

said to cause gastric irritation by prolonged use, but sugar itself is open to the same charge. **Crystallose** is a derivative of saccharine used in Germany, and is said to have the advantage of being free from the slightly metallic and, to some persons, disagreeable taste of saccharine. **Dulcin** (Sucrol), the other sugar substitute, is less well known, and may be regarded as being still upon its trial.

Milk is undoubtedly one of the most valuable articles of diet, as it is highly nutritious, and when properly diluted is easily digested; moreover, it has the additional advantages of being exceedingly cheap and easily procurable. Owing to its bulk, the quantity required to supply the necessary amount of heat-units for a man performing hard work being 9 pints daily, an exclusive milk diet is used mainly for young children and for invalids. The great objection to it is that it is so often the means of conveying infectious diseases, but this may be prevented by boiling or sterilising it. It is often stated that boiled or sterilised milk tastes disagreeably, but this is mainly a question of the care with which the operation is performed; a more serious charge is that it is less digestible, but careful experiments, performed by me eight years ago, satisfied me that boiled milk is more digestible than unboiled milk; further, it has been alleged that the lime salts are precipitated by the process of boiling, this I did not find to be the case. Finally, we are told that boiling destroys its anti-scorbutic properties, but there is no proof of this, except that some children have suffered from infantile scurvy when taking sterilised milk, yet there is abundant experience to the contrary, and in the present state of our ignorance about the causes of scurvy we may well hesitate to draw conclusions. Sterilised milk has the advantage over boiled milk, that when coagulated with commercial rennet, hydrochloric acid, or gastric juice it forms a soft

clot, very little thicker than cream, but slightly lumpy, while unboiled and even boiled milk form a much firmer curd. The digestibility of milk is increased by diluting it, especially with an alkaline water, such as lime water or Vichy water, the diluent being added in equal quantities to the milk.

The practice of peptonising milk is not to be commended, as if it is performed effectually the milk becomes bitter and undrinkable. The so-called peptonised milk which nurses prepare probably owes any extra digestibility it possesses to the presence of bicarbonate of soda in the peptonising powder, which delays the coagulation of the milk in the stomach.

Milk-powder, which is milk deprived of its fat and then coagulated, dried, and powdered, contains the albuminous and mineral constituents with the sugar of milk, but not the cream. It may be added to milk so as to increase its nutritious properties, and has been found useful in the diet of rickety children.

Whey contains salt, sugar, and a little lactalbumen; it is easily digested and palatable, and is readily taken by invalids, but its dietetic value is small.

Koumiss, or fermented mares' milk, made by the Tartars, is no doubt an excellent article of diet, but it cannot be procured here. The fermented cow's milk or Kefir, prepared in London, has proved useful in the treatment of disease, but it is a troublesome and expensive article of food to obtain at a distance from the place where it is prepared.

Asses' milk can rarely be obtained in this country, and goats' milk, on account of its high percentage of casein, is inferior to cows' milk for invalids.

In giving milk to children or invalids, it should be boiled or sterilised, and diluted with an equal quantity of

lime water or Vichy water or barley water. The quantity placed at the bedside of an invalid should not exceed 4 ozs., and should often be less, as a large quantity of milk taken at once may be a source of discomfort, or even of danger.

Plasmon is soluble milk albumen (casein), which is easily digested, and may be added to milk or taken dissolved in hot water, or bouillon where milk does not agree. Lacto-somatose, protene, and eucasein are somewhat similar preparations.

In the arrangement of the **diet** of persons suffering from stomach diseases it is necessary to consider their food under the headings of (*a*) its digestibility, (*b*) solubility, (*c*) chemical composition, and (*d*) physical or chemical capacity for causing irritation.

The term "digestibility" is not free from ambiguity. To the laity it means food which causes no discomfort after eating, a condition which depends partly upon the individual, and is compatible with a high degree of resistance to the digestive juices; but to the medical profession it implies food which is readily converted into absorbable material by the digestive secretions. Our knowledge of the rate at which various articles of food are digested has been gained by direct observation upon patients who have had openings in their stomach, upon animals, and by artificial digestion experiments *in vitro*. The first is open to the objection that the patients were not under normal conditions; the second, that the digestion of animals differs in many respects from that of man; and the last, that no experiment in a test tube can exactly represent what takes place in the human body. Still these results, when taken together, afford a certain number of data which harmonise well with clinical experience, and may be accepted as fairly correct.

I do not reprint the tables of Beaumont, Richet, and

Penzoldt, but they have been taken into account in drawing up the general rules which follow. We may classify food into (1) *very readily digestible*, or that which is digested in from one to two hours; this includes boiled or sterilised milk, meat soups, and broths without added vegetables, softly cooked eggs, meat extracts, jellies made from meat-gelatine or isinglass, plasmon, and somatose. (2) *Readily digestible food*, which takes from two to three hours to digest, includes raw eggs, or eggs "scrambled" or, in omelettes, raw oysters, white fish, boiled chicken and turkey, lamb, calves' feet and brains, sweet-bread, tripe. calves' liver, mashed potatoes, and tender well-cooked green vegetables, stewed fruit without skin or seeds, toasted or stale white bread. (3) *Digestible food*, which requires from three to four hours to digest, includes roast chicken and turkey, partridge, tender beef and mutton, ham, bacon, boiled rice and oatmeal, soft ripe uncooked fruit, potatoes, and brown bread. (4) *Less digestible food*, requiring more than four hours, includes pork, veal, salmon, mackerel, pigeon, goose, duck, hare; smoked or pickled meats, vegetables, and fish; cheese, cream cheese, pease, beans, lentils, root vegetables (such as carrots, turnips, and parsnips), salads, many fruits (especially those which contain much cellulose), pastry, and cakes.

The *solubility* of food means its solubility in water, and in the digestive juices. These juices act on and render soluble many articles of food which would be insoluble in water alone, but their solubility is, as a rule, greatly aided by cooking, although, if cooking be carried to excess, the opposite result may ensue—that is to say, food may be rendered so hard and dense as to become difficult for the digestive juices to penetrate. Besides cooking, another important factor in the preparation of food is its state of division, for, otherwise digestible food, if swallowed in large

lumps, is acted upon very slowly by the digestive juices; food is, therefore, rendered more soluble if it is minced and pounded or mashed, or passed through a sieve. Among insoluble substances likely to be taken as food may be enumerated uncooked or imperfectly cooked starch, bran, husks, skins, seeds, and stalks of vegetable origin, bones, cartilage, membranes, fibres, and pieces of muscular tissue which have been hardened by over-cooking or over-exposure to brine or smoke, or have become dry.

The *chemical composition* of food is the basis for the formation of a scientifically sufficient diet. The elements of food are (*a*) water, (*b*) mineral salts, (*c*) albuminoids, (*d*) carbohydrates, and (*e*) fats. The water of food is of no nutritive value, but constitutes a very large part of its bulk. It may be removed by drying, and in this way it is possible to reduce the bulk of food, but not to the extent popularly believed. The ox in a tea-cup of our mural advertisements is a figment of the imagination. Many experiments have been made for the purpose of supplying soldiers with food in a concentrated form, but it has been found impossible to concentrate it to less than three-fifths of its original bulk, if we are to preserve the whole of its nutrient value.

The salts of food are chiefly salts of sodium, potassium, calcium, iron, phosphorus, and sulphur. Of these the most important is sodium chloride or common salt, which is found in abundance in animal food, so that meat eaters do not need to add this condiment. On the other hand, vegetable feeders generally crave for it, so that herbivorous animals have to be given it with their food, or in a wild state travel long distances to salt springs, where they can obtain a supply. The use of salt by civilised man can hardly be the result of any physiological need, as he gets sufficient for his body in his food, but it gives flavour, and

this promotes appetite and the flow of gastric juice. Calcium salts are important on account of their entering into the formation of the bones and teeth, as well as of other tissues. Excess of lime has been accused of favouring the occurrence of stone, also of endemic goitre, but the connection has not been fully established.

Phosphorus is derived from phosphates in meat, blood, and cereals.

Iron occurs in the blood pigment, and is, therefore, contained in the blood which remains in the meat which we eat. The laws which govern the assimilation of iron are not well understood, although we have abundant clinical experience of the fact that large doses of iron speedily cure chlorotic anæmia dependent upon deficiency of hæmoglobin.

The albuminoids, carbohydrates, and fats are really the important elements of diet, and their value depends upon the number of heat-units which they furnish. A gramme of albumen gives four heat-units, a gramme of carbohydrate the same, and a gramme of fat gives nine, but food, of course, rarely consists of either pure albumen, pure fat, or pure carbohydrate, but the value of most of the articles of food has been worked out. The following are the value in heat-units of 1 oz. of each of the named articles of diet:—

Meat, . . .	35	Jam, . . .	65
Milk, . . .	17	Cabbage, . .	10
White bread, . .	75	Cheese, . . .	117
Potatoes, . .	23	Butter, . . .	240
Oatmeal, . .	115	Fat, . . .	270
Sugar, . . .	115	Cream, . . .	60

It has been calculated that for each kilo. (about 2 lbs.) of body weight 32 heat-units are consumed during repose, 34 on slight work, 41 on moderate work, and 48 on hard

work, so that a person weighing 10 stone (70 kilos.) on slight work requires daily to consume food of the value of 2,450 heat-units. This he may readily do if he eat a fair amount of bread and butter, so that a diet consisting of 6 ozs. of meat, 1 lb. bread, 6 ozs. potatoes, a pint of milk, and 2 ozs. butter gives 2,500 heat-units. Tea and coffee, which afford no heat-units, can be taken as well. The addition of alcohol to such a diet appreciably raises its alimentary value, as 1 grm. of alcohol affords 7 heat-units, or an ounce of whisky gives 105. These figures should only be used in order to determine approximately whether a given diet is sufficient or not. It by no means follows that because it is sufficient it is, therefore, satisfactory, because it must be palatable, and the various elements must be combined in suitable proportions. Some persons can assimilate larger quantities of sugar and fat than others, and so readily make up the required amount, while others may dislike both, or find them disagree with them. It is plain, however, that the bread, butter, and milk diet of the school-room is one which contains all the necessary elements of nutrition, and that there is no reason to suppose that it does not supply the force needed for growing boys and girls. The experiments recently carried out by Chittenden indicate that the above estimates of the quantity of heat-units necessary for the maintenance of perfect health and fitness for even great physical exertion are excessive. He has shown that athletes may be trained and kept in the pink of condition on a diet of a total heat value not exceeding two-thirds of these figures, while the proportion of proteid need not exceed 50 grms., which is about one-third of the amount supposed to be needed by persons engaged in hard work. His experiments were conducted so carefully, included such a large number of subjects, and extended over so

long a time that, attested as their results are by indisputable evidence, I have no doubt they will lead to a reconsideration of the foundation of those opinions which have been accepted as our guides in dietetics, and should cause a revolution in medical practice, as they prove that the quantities of food generally taken are largely in excess of our requirements, while improvement of health follows on their reduction. If this be true in the case of healthy persons, those with weak digestions have still more to gain by adopting a regimen which will diminish the tax upon functionally defective organs.

The last aspect in which we have to consider articles of diet is of the greatest importance to us, as practitioners, in dieting patients who are suffering from conditions in which more or less inflammation of the mucous membrane of the stomach or intestines is present. Many substances are irritating on account of their *physical* condition; this is true of oatmeal and brown bread owing to the bran they contain, and although they are often useful in cases of constipation, where the irritation caused by them is only sufficient to produce a healthy stimulus, in inflammatory conditions they are mischievous and do harm. These remarks apply to all husks, skins, and seeds derived from vegetables. Such uncooked vegetables as celery and radishes, salads and cresses, are capable of causing irritation, and have, therefore, to be forbidden in all catarrhal states of the alimentary canal. Condiments and spices, such as mustard and pepper (both black and red), in certain cases aid digestion by stimulating secretion of the gastric juice, but where inflammatory conditions are present they cause irritation and consequently do harm.

Fruit which is over-ripe, or animal food which has undergone partial decomposition, may contain (as is well known) irritating chemical products capable of causing intense

irritation. Certain fats, notably cream, are liable to undergo changes in the stomach in which they give rise to intense irritation, probably by the formation of acids. Any fat which has been subjected to the influence of heat, such as the roasted fat of meat, or fat which has been used in frying, may contain these irritating acids, and be, therefore, apt to disagree with some people. For this reason we are often obliged to limit the amount of fat given to patients suffering from inflammatory conditions of the stomach, and are unable to adopt the theoretically constructed diet tables chiefly emanating from Germany, in which fats figure so largely.

II. DISEASES OF THE ŒSOPHAGUS.

Cancer of the Œsophagus.—Cancer of the œsophagus generally attacks elderly people, and is more common in males than in females. It is usually localised, the common sites being—(1) the junction of the pharynx with the gullet; (2) the point where the middle and lower thirds meet; and (3) the cardiac opening; but at times the whole viscus may be involved. The cardinal symptom is difficulty of swallowing, chiefly of solid food, but the obstruction is rarely if ever complete. Vomiting is common, it comes on immediately after food, and there is, as a rule, considerable loss of flesh. In a case of extensive carcinoma of the œsophagus under my care there was loss of voice, with paralysis of the *adductor* muscles of the vocal cords (*Brit. Med. Journ.*, 1904, vol. I., p. 589).

Diagnosis.—The diagnosis is made by the history, the age of the patient, the presence of wasting, loss of appetite, and vomiting, and by passing a full-sized œsophageal sound by which the existence of narrowing of the canal may be recognised. Its position may be determined by measuring the distance which the sound passes from the incisor teeth. The usual figures given are—to the commencement of the œsophagus 13 to 14 cm. (5½ ins.), to the junction of the middle and lowest thirds 26 to 27 cm. (10½ ins.), and to the cardia 40 cm. (15¾ ins.). When cancer is present there is often blood mixed with the mucus on the sound when it is withdrawn, or the patient may vomit blood after the operation.

Differential Diagnosis.—Cancer is by far the most

common cause of organic stricture, especially in elderly persons, and when the obstruction is associated with the signs and symptoms already indicated there is little room for doubt. Syphilitic stricture should be accompanied by a specific history and by the presence of other signs of constitutional disease; it is rare. Cicatrices due to injury from swallowing corrosive fluids always have a well-marked history of the accident, while spasmodic stricture readily yields to the passage of the sound.

Treatment.—The diet must consist of nutritious liquids, such as eggs beaten up with milk, soup, and starchy food in the form of thin gruel. As a rule, a sufficient quantity of food to maintain life can be swallowed throughout the course of the disease, for the wasting and loss of strength which ensue depend as much upon the cachexia of the disease as upon actual inanition. As liquid diet is bulky and the quantity which can be swallowed at any time limited, food must be given every hour or every two hours during the day time. The quantity aimed at should be 4 pints of milk, 1 pint of soup, 1 pint of gruel, and 2 eggs. The patient may take thin purées of potato as a change from gruel, and should be allowed tea or coffee with sugar, milk, and cream; Koumiss or Kefir may be tried. Somatose or plasmon may be added to the milk or soup.

It may be difficult to give a full amount of food in this way in spite of every expedient; the tables in books make up the deficiency by recommending an impossible quantity of fat in the form of butter or cream. Small quantities (ʒij to ʒiij) of cod-liver oil or pancreatic emulsion may be tried, but not more, as it is doubtful whether larger doses are fully absorbed, and, if this is true of these, it is still more likely to be the case in respect of the less easily assimilated fats, such as cream.

Up to the present there is no trustworthy means of

treating cancerous growths, the hopes held out by the numerous "sera" invented during the past few years having proved delusive. We are, therefore, reduced to using palliative means to relieve pain and spasm, of which hypodermic injection of morphia ($\frac{1}{6}$ to $\frac{1}{3}$ grain) is the best. This may be combined with atropine ($\frac{1}{200}$ to $\frac{1}{100}$ grain), which is held to diminish spasm. Where swallowing causes pain and is consequently performed with difficulty, it has been suggested to try to afford relief by administering a teaspoonful of a solution of cocaine or eucaine just before food, but only weak solutions (1 per cent.) can be employed on account of the toxic action of these substances, and, unfortunately, the analgesic power of such weak solutions is very limited. Teaspoonful doses of olive oil (No. 11)* before food are said to assist deglutition. Mechanical treatment of all kinds should be avoided, including the use of even the soft stomach tube, as accidents may easily happen.

In those cases in which the obstruction is so great as to prevent a sufficient supply of food being taken, a gastrostomy should be performed, but it is useless to have this done when the patient is moribund; it should be undertaken so soon as the power of swallowing liquid nourishment is seriously impaired.

Nutrient enemata (No. 24) may be used to supplement the nourishment taken by the mouth, but cannot be relied upon to any great extent or for any length of time.

Among reputed remedies for cancer which still possess some slight reputation, probably because, in these cases, they have only recently been recommended, are violet leaves (*Viola odorata*), of which the dose of the liquid extract is a teaspoonful, or a decoction prepared from the fresh green leaves may be given; X rays and radium are still unexploded novelties. In the absence of any other

* The numbers refer to the List of Formulæ at the end of the volume.

indication, it may be worth while trying the effect of a course of red iodide of mercury with iodide of potassium (No. 12), which at least can do no harm. The advantage of some medication is that it satisfies the natural desire of the patient and his friends that something should be done, and prevents his resorting to quack remedies which may be injurious.

Ulceration.—This condition is, on the whole, rare. It may occur in the course of various diseases, such as tuberculosis, syphilis, diphtheria, smallpox, scarlet fever, enteric fever, or even simple catarrh, from swallowing foreign bodies such as false teeth, or most seriously, and perhaps most commonly, from the swallowing of corrosive fluids, especially strong acids and alkalies. Fissures and erosions at the cardia may give rise to similar symptoms.

Symptoms.—Apart from the severe shock and collapse which follow the swallowing of corrosive fluids, the signs of ulceration are burning pain behind the sternum, increased by swallowing, and especially by taking, solid food, with spasm and regurgitation of food if the ulcer is near the cardia. Later on, mediastinal abscess may form without any actual perforation, and such an abscess may burst into the pleura, causing empyema. A more formidable complication is the erosion of one of the great thoracic vessels by perforation of the ulcer through the wall of the œsophagus. The ulcer may, under favourable circumstances, heal without giving rise to any evil consequence, but severe injuries are usually followed by stricture and spasm, or dilatation above the obstruction.

Treatment.—The only specific remedies are in the case of syphilitic ulcer, when the mercuric iodide mixture (No. 12) should be given. In the others the treatment must be mainly palliative, and dietetic injections of morphine and atropine may be necessary to relieve the painful spasm,

and liquid diet, as described for cancer, should be ordered. Where swallowing causes much pain, nutrient enemata (No. 24) may be given instead, so as to afford complete rest to the œsophagus. The use of enemata is more satisfactory here than in cancer, as the patient's general condition is usually good and his strength is not being undermined by constitutional disease.

Simple Stricture.—Simple strictures of the œsophagus are the result of chronic ulcers, especially after injury by swallowing corrosive fluids. In the latter case there may be more than one narrowing of the canal.

The diagnosis of such strictures is easy in the light of their history, and their position and degree can be readily ascertained by the use of the sound.

Treatment.—The usual treatment is mechanical—that is to say, the gradual dilatation by means of sounds. MacCormac's dilator, with its set of olive-shaped terminations, is an excellent means for effecting gradual dilatation, but is not applicable to cases of impermeable stricture. If no instrument can be passed through the stenosis gastrostomy must be performed and an attempt made to penetrate the stricture from below.

Prof. Klemperer speaks favourably of the use of hypodermic injections of thiosinamine as a means of softening the cicatrix and facilitating the process of dilatation. The solution he employs is—thiosinamine 10, glycerine 20, distilled water 70, of which from a half to the whole of a syringeful is to be injected under the skin of the back three times a week.

Dilatations.—There are two forms of dilatation, the **Fusiform** and the **Saccular**. Fusiform dilatation may be the consequence of a congenital weakness of the muscular coat, but depends upon a cicatricial or spastic stenosis of the cardia. The *Treatment* consists of dilating the cardiac

opening by means of sounds, and feeding the patient upon the fluid diet already described. Saccular dilatations or diverticula are lateral pouchings of the wall of the œsophagus, generally situated in its upper half. They are divided into "pressure diverticula" and "traction diverticula."

Pressure diverticula are due to the giving way of a weakened portion of the muscular wall to form a small pouch, which is constantly filled with food during the act of swallowing; this act involves the compression of the mass of food by the muscular fibres of the œsophagus, so that the weak spot tends to yield and the pouch grows constantly larger and larger.

Traction diverticula are caused by the adhesion of a limited area in the wall of the œsophagus to some neighbouring organ, such as the pleura, or to inflamed bronchial glands. The symptoms of these diverticula are difficulty in swallowing and frequent vomiting.

The *differential diagnosis* of these conditions may be made by giving the patient a glass of water to drink which has been coloured with methylene blue. If the stomach tube is introduced it will draw off first a blue coloured fluid, but if pushed onwards it withdraws uncoloured stomach contents containing hydrochloric acid; on the other hand, if the tube has entered a diverticulum it will be impossible to push it further.

Treatment.—The only satisfactory treatment of these pouches is by a surgical operation.

Foreign Bodies.—Coins, small toys, pieces of bone, and, above all, artificial teeth may lodge in the œsophagus; many of these can be withdrawn by the coin-catcher, the œsophageal forceps, or may be gently pushed into the stomach by means of a sound. In some cases the foreign body has been successfully passed onwards by giving the patient soft pultaceous food, such as mashed potatoes, bread

and milk, or stewed figs. If all these means fail œsophagotomy may have to be performed.

Neuroses.—The commonest neurosis of the œsophagus is the so-called **spasmodic stricture.** Doubt has been expressed whether this is a pure neurosis or a reflex spasm set up by some slight erosion or ulcer near the cardiac opening. The objection to the latter view is that it is, as a rule, readily and completely cured by the passage of a large sized œsophageal sound, which would not be the case if there were a substratum of organic disease. Less common is the condition called **œsophagismus,** occurring, as a rule, in hysterical or neurotic women. This spasm of the œsophagus may be moderate in degree, but sufficient to prevent swallowing, or it may be so severe as to cause pain and great distress. A young married lady suffered from bladder tenesmus for which she was carefully examined, and ultimately the neck of the bladder was stretched, without any organic disease being found or any great benefit resulting. After some time the condition passed off, but was replaced by an œsophageal spasm which came on while eating and prevented her completing her meal, but was never so serious as to call for special treatment. Another lady had suffered from a variety of nervous symptoms for twenty years, but was in fairly good health when, in consequence of some family trouble, she was seized with the most violent œsophageal spasm, which could only be relieved by hypodermic injections of full doses of morphia; the condition recurred on more than one occasion, but not so severely.

Nervous Eructation is an exceedingly disagreeable form of œsophageal neurosis, both for the patient and for her surroundings; it is caused by swallowing air and bringing it up again; in doing this a loud explosive noise is produced which can be heard at some distance. Like hiccough it is

not altogether under the control of the patient, but is temporarily stopped by swallowing anything, such as a little water, and no doubt much can be effected by the patient if she will do her best to break the habit. Pressure upon the epigastrium sometimes relieves it. Sir Thomas Watson speaks of a case which was "continual and distressing, and which prevented the girl from being able to obtain employment as a servant." The treatment should be for the general neurotic condition, change of air, general massage, isolation, and a Weir-Mitchell course. Medicinal remedies may be tried, such as the bromide and valerian mixture (No. 3).

III. DISEASES OF THE STOMACH.

(*a*) Organic Diseases.

Acute and Chronic Gastritis. — Gastritis, frequently called catarrh of the stomach, is a common affection but seldom a primary disease. It may originate in simple errors of diet where the stomach has suffered in other ways so as to be predisposed; yet this organ, although tolerant, may be so abused as to become inflamed as a direct result of irritation produced by excess, especially alcoholic excess, or by unsuitable food or drink, or by irritant drugs or poisons, or by the voluntary or accidental swallowing of hard indigestible substances, such as pieces of bone, glass, or metal. Excess of cane sugar may cause acute gastro-enteritis, and so may many kinds of fruit, particularly if unripe or over-ripe. Loss of teeth by preventing proper mastication frequently causes permanent irritability of the stomach, rendering it liable to periodic attacks of gastritis. We must, therefore, recognise a gastritis *ab ingestis*. Another common cause is any infectious process, including an ordinary cold in the head, but notably influenza, which often leaves the stomach irritable for a long time afterwards; enteric fever is also frequently followed by a permanently weakened stomach. But the most common of all causes is that which accounts in the main for the indigestion so common among the populations of our great cities, particularly the women. The essential factor in its production is debility, leading to atony of the muscular wall, defective peristalsis with consequent delay of food in the stomach, and dilatation. Although atonic stomachs empty themselves, as we shall see, in seven or

eight hours, the undue retention of food is yet enough to impair the healthy tone of the gastric mucous membrane, and leave it predisposed to attacks of inflammation from slight occasional causes. These cases of atonic dilatation are, therefore, often complicated by acute, sub-acute, or chronic gastritis.

The symptoms of **acute and sub-acute gastritis** are burning pain behind the sternum, coming on from one to two hours after taking food; the tongue is covered with a light brown paste. There may be some vertigo or headache. Unfortunately the subjective symptoms by no means correspond to the amount of inflammation in the stomach, as is shown in Beaumont's classical description of the case of Alexis St. Martin. After drinking ardent spirits pretty freely for eight or nine days St. Martin complained of an uneasy sensation with tenderness at the pit of the stomach, some vertigo with dimness and yellowness of vision on stooping and rising again. He had a thin yellowish-brown coating on his tongue and his countenance was rather sallow, but otherwise he felt well. His appetite was good and he slept as usual, but the stomach, as seen through the fistulous opening, showed "extensive erythematous livid patches, on the surface of which exuded small drops of grumous blood, large and numerous aphthous ulcers, the whole covered with thick mucus. The gastric fluids when extracted were mixed with a large proportion of thick, ropy mucus and considerable muco-purulent matter slightly tinged with blood, resembling the discharge from the bowels in some cases of chronic dysentery."

It is this absence of any serious subjective warning sensation, such as pain, which permits so many patients to continue to abuse their stomachs until the inflammation has become inveterate. Vomiting occurs in severe cases, or in children, but is rare under ordinary circumstances.

In **chronic gastritis** the tongue may be clean or, more often, furred posteriorly. Pain is usually absent, but the patient complains of a feeling of weight or oppression two hours or more after eating, and there may be vomiting, in the form of morning sickness, which is characteristic. The vomiting is usually preceded by a tickling spasmodic cough which leads to much retching, and, finally, a mouthful or two of glairy mucus is brought up. Some of the worst cases of chronic gastritis are caused by the abuse of alcohol.

Diagnosis.—The diagnosis of the forms of gastritis may be easily made by attention to the symptoms already described, but it is not enough to recognise this condition without determining whether or not some underlying and predisposing condition of the stomach is present. Unfortunately the usual practice is to treat the gastritis more or less successfully, but the patient does not get quite well because the cause has been overlooked, and he very soon suffers from a recurrence of his former symptoms.

Treatment.—The dietetic treatment for acute or subacute gastritis should, as far as possible, involve rest to the stomach, abstinence from all food which is irritating either from its chemical composition or its mechanical state. A quite recent attack of only a few hours' duration may be successfully treated by drinking slowly 20 or 30 ozs. of warm water so as to dilute the gastric contents, but if the pain does not subside the stomach must be emptied, either by tickling the pharynx or by giving a sulphate of zinc emetic (20 grains); the food should be hot water, or milk diluted with two parts of water, for the rest of the day, and on the following day only the blandest food should be taken.

The following articles of diet are to be forbidden to persons suffering from gastritis:—All fats, including butter; pork, veal, salmon, mackerel, eels, lobster and

crab, and all smoked or salted meats and fish, all fried and greasy dishes; porridge, brown bread, pastry, uncooked fruit, all fruit containing seeds and skins, or until these have been removed; nuts of all kinds; all raw vegetables or salads, radishes, cresses, mushrooms, carrots, turnips, parsnips, pickles, sauces, pepper, cheese, cream cheese, malt liquors, spirits, port, madeira, sherry, Indian and Ceylon teas, iced water and iced creams.

During convalescence from an acute attack, or in chronic cases, the diet should be something like the following:—*Breakfast*—Toasted white bread, white fish boiled or broiled, cocoa, coffee, or China tea infused with milk; no butter. *Luncheon*—A slice of mutton or a mutton chop without fat, mashed potatoes, milk pudding, no alcohol, or only light wine well diluted with mineral water. *Tea*—China tea infused with milk, Madeira cake. *Dinner*—No soup; white fish boiled or broiled, lean beef or mutton, fowl or fresh game lightly cooked, mashed potatoes or any tender green vegetable, baked custard or stewed fruit without cream, no alcohol, or only light wine well diluted with mineral water.

The following course of drugs will be found useful:—Two 5-grain blue pills should be ordered, of which one should be taken that night at bed time and the other on the second night, and the patient told not to repeat these pills. Either the rhubarb and bismuth mixture (No. 4) or the compound bismuth powders (No. 17) should be given before each meal, and half a tumbler of hot water should be sipped slowly the first thing in the morning, to which may be added a teaspoonful or more of effervescing sulphate of soda, if the bowels need assistance.

The *treatment of chronic catarrh* of the stomach is more difficult, as the disease has not the same tendency to spontaneous recovery and is more often associated with serious anatomical changes, such as atonic dilatation or

pyloric obstruction, or organic disease of the heart, lungs, liver, or kidneys, upon which it in a great measure depends.

In regulating the diet, those articles already enumerated which may cause irritation must be eliminated, and, for a time, a strict regimen must be maintained. The two main lines of dietetic treatment are—(*a*) milk, which should be diluted with barley water or soda water, and is best sterilised; (*b*) minced lean meat, which should be prepared in the same way as the Scottish national dish called collops. This minced meat is eaten without bread or vegetables, but hot water *ad libitum* may be allowed between meals. Many cases which resist milk diet improve rapidly upon minced meat; it is, perhaps, most useful in cases complicated by hypersecretion of gastric juice, but this cannot always be proved by the chemical examination of the stomach contents.

The most useful drugs are bicarbonate of soda, sulphate of soda, bismuth, magnesia, and mercury, the last in the form of calomel or blue pill. The treatment may commence by a course similar to that given in sub-acute gastritis, but when the gastric irritability has been allayed the acid mixture (No. 6) may be usefully substituted and continued for some time. This is always indicated where the urine deposits amorphous alkaline phosphates. If the patient is troubled by acid eructations, the antacid mixture (No. 5) or the olive-oil mixture (No. 11) should be given before each meal. If the appetite is bad, give the soda and gentian mixture (No. 1) before meals. The bowels must be kept freely open, by the use of aperients if necessary, such as effervescing sulphate of soda or Rubinat water, or, in patients of spare and nervous habit, a pill of aloes or cascara.

Such cases are treated successfully at many mineral water-cure places, notably at Carlsbad, Homburg, Kis-

singen, Neuenahr, Vichy, and Châtel-Guyon. Of these, Carlsbad and Vichy are the best equipped. Homburg has become fashionable, but many visitors continue their London habits of extravagant dining while professing to take the waters, and so neutralise their good effects. Kissingen is less frequented by English people, and the arrangements of the place are not so much in harmony with English tastes. Neuenahr is a pretty station, which may be preferred by those who object to a long journey and wish for a simple and comparatively inexpensive life. Vichy is excellent in all its arrangements, and compares favourably with Carlsbad, while, in addition, it is nearer and less expensive. Châtel-Guyon may be classed with Neuenahr, but does not possess the magnificent arrangements for visitors to be found at Vichy.

Ulcer of Stomach. — Experiments on animals have shown that normal gastric juice does not prevent the healing of wounds of the stomach in healthy animals, so that for the production of an ulcer we must assume that there has been not only a lesion of some kind causing a loss of substance, but, in addition, some deterioration of health which lowers the resisting power of the tissues, as in anæmia and tuberculosis; or there may be excessive acidity of the gastric juice which renders it more than normally hindering to the healing process.

The symptoms of ulcer of the stomach are pain, which comes on soon after food, vomiting and hæmatemesis. Pain and vomiting after food may give rise to the suspicion of gastric ulcer, but are not sufficient to warrant a diagnosis as they may occur from a simple neurosis. Hæmatemesis may be due to various causes, but the hæmatemesis of gastric ulcer is generally more profuse than that from cancer, which it otherwise resembles from its association with painful digestion. The condition with which gastric

ulcer is most commonly confounded is undoubtedly chlorotic gastralgia, in which the patient often complains of severe pain after food, and there may be vomiting; as both conditions occur commonly in young anæmic females it may be at times impossible to differentiate certainly between them, but this is not so important as might be supposed, the treatment for both conditions being identical.

The complications and sequelæ of ulcer are perforation, profuse hæmorrhage, perigastric adhesions, cicatricial contractions causing stenosis of the pylorus and hour-glass stomach. Some authorities believe that simple ulcers in a large proportion of cases become cancerous, but in this district (Birmingham) ulcer of the stomach is an exceedingly common disease, while cancer of the stomach is rare, so that there does not appear to be any inherent tendency in simple ulcers to become malignant.

Ulcer of the duodenum is so closely allied to ulcer of the stomach in its anatomical features and in its mode of origin that its treatment may most conveniently be discussed here. Its symptoms differ from those of ulcer of the stomach in the pain coming on later and being rarely accompanied by vomiting or hæmatemesis, the hæmorrhage taking the form of melæna. The symptoms may be only vague abdominal pains with progressive anæmia and are often misunderstood, but the melæna if discovered gives the key to the diagnosis.

Treatment. — Ulcer of the stomach should always be treated in bed, and indeed it may be said that frequent vomiting is in itself a sufficient indication for sending the patient to bed, so that whether caused by an ulcer or a simple neurosis the treatment is the same. In nine cases out of ten the pain and vomiting stop after the patient is placed in bed, and the stomach tolerates diluted milk—*e.g.*, 1 oz. of equal parts of milk and lime water every hour.

Where there has been hæmatemesis within forty-eight

hours it is advisable to rest the stomach completely and feed by the rectum. A nutrient enema is composed of one or two eggs beaten up with 5 or 6 ozs. of milk and a pinch of salt added; it should be injected slowly into the rectum. The bowel should always be previously cleared out by a simple enema or an irrigation of normal saline solution. Such enemata must be repeated every four hours and may be continued for three or four days. Some writers recommend that rectal feeding should be kept up longer in order to permit the stomach ulcer to heal, but it is generally admitted that ten days is the limit in which nutrition will not suffer seriously, so that as the main factor which prevents the healing of the ulcer is the depressed general health, and as the amount of nutriment absorbed from the rectum is small continued rectal feeding does not seem likely to promote recovery, and more harm than good results from prolonging it beyond what is needed for safety. On the other hand, stomach feeding has never in my experience done harm, but if it should cause a return of pain, rectal feeding can always be resumed for a day or two.

During the first week the food must be liquid and the quantity of milk and lime water should not exceed 4 ozs. each hour. In the second week, if there has been no return of symptoms, bread and milk, made with soft roll, may be added, morning and evening, and custard pudding given in the middle of the day, the milk being continued. The patient should not be roused from sleep in order to take the milk at night during this course of treatment.

In the third week the patient may have 4 ozs. of minced chicken with a little mashed potato, and cocoa or milk tea for breakfast with soft roll and butter. In the fourth week the patient should be able to take ordinary food so long as it is soft and well cooked, but, if the teeth are defective, meat must still be minced or pounded.

The most useful medicinal treatment is iron combined, as in the aperient iron mixture (No. 7), with sulphate of magnesia, the latter being given in sufficient doses to keep the bowels open as constipation is generally present.

No other medicine is ordinarily required, but if there is pain we may give the antacid mixture (No. 5) or the olive-oil mixture (No. 11) before food.

The administration of nitrate of silver in pill, in the hope of stimulating the healing of the ulcer, is futile, for the probability is that the pill will not dissolve in the stomach, and if it does the chances are greatly against its coming in contact with the ulcer. The practice of washing out the stomach with a solution of nitrate of silver, or the administration of teaspoonful-doses of a half per cent. solution by the mouth, is not supported by our experience of the treatment of deep ulcers elsewhere. I have not used these remedies, and I have not found any sensible delay in the progress of my cases from their omission.

Recurrence of hæmorrhage indicates resumption of rectal feeding, stoppage of all medicine by the mouth, the application of an ice-bag to the epigastrium, and a hypodermic injection of morphia ($\frac{1}{6}$ grain).

Frequently recurring hæmorrhage suggests the propriety of surgical interference, but it is rarely needed. When the stomach has been opened it has been often difficult to find the bleeding point, and consequently surgeons are not anxious to interfere in these cases (see *Indications for Operative Interference*, p. 74).

I have never known perforation to occur while the patient was under treatment in bed, but whenever it does take place it indicates surgical intervention without delay.

Perigastric adhesions, stenosis of the pylorus, and hour-glass stomach cause structural changes which may interfere seriously with the function of the organ, and these can

only be remedied by surgical means. Klemperer strongly advocates a trial of the hypodermic injection of thiosinamine (No. 22), which is said to soften and remove fibrous bands; it may be tried for a time in the absence of urgent symptoms.

Ulcer of the duodenum, in my experience, is much less amenable to medical treatment, and when recognised should be treated surgically by means of gastro-enterostomy.

During the time the patient is kept in bed it is desirable to aid recovery by general massage.

The diet should be brought up to the normal standard before the patient is allowed to leave her bed, and, after getting up, no variation should be made for some weeks. If possible a change to some bracing health resort should follow, and the aperient iron mixture (No. 7) should be continued until the anæmia has completely disappeared.

Cancer of the Stomach.—The origin of cancer of the stomach is shrouded in the obscurity which hangs over the entire subject of the causes of malignant diseases, but there is no doubt that it occurs most frequently among the inhabitants of the valleys of great rivers, and becomes more common as people advance in life.

Cancer may attack the pylorus, the cardiac opening or any part of the body of the stomach, or may diffusely infiltrate the whole organ. When it occurs at the openings it gives rise to symptoms of their obstruction or stenosis.

Although ulcer of the stomach may, in some cases, become cancerous, the history of stomach cancer is, as a rule, recent. There is rapid loss of weight, progressive weakness, and absence of desire for food. The patient may complain of pain which is independent of food, although it may be aggravated by it, and is usually of a sharp, cutting character. Difficulty in swallowing may be present if the cardiac opening is involved, and vomiting may occur if

the pylorus is affected. The vomited matter is frequently mixed with blood, giving rise to the characteristic "coffee-grounds'" vomit. If the disease is situated at the pylorus the stomach is usually more or less dilated, and if distended by CO_2 the distention can be made out and at the same time the thickened pylorus or lump may be felt. The detection of a painful mass in any part of the stomach, when taken with the other symptoms, leaves little doubt of the presence of cancer. Examination of the chemical functions of the stomach generally shows absence of free hydrochloric acid and of the milk-curdling ferment, but these may be present in the earlier stages of the disease, and, therefore, do not help much in the diagnosis of doubtful cases. The presence of lactic acid and butyric acid and of the Boas-Oppler bacillus have also been suggested as valuable diagnostic indications; but lactic acid is constantly present after an Ewald test breakfast, owing to a certain amount of lactic acid being found in bread, so that a meal of minced meat or oatmeal water-gruel must be substituted for it. The Boas-Oppler bacillus is composed of long thread-like joints, and is certainly not always present in cases of cancer of the stomach. As a rule, the diagnosis presents no great difficulty, but since the era of stomach surgery we have learnt how latent in certain cases the characteristic signs of cancer may be.

Treatment. — The radical treatment of cancer of the stomach is undoubtedly surgical, and there is reason to believe that if the diagnosis can be made sufficiently early the results of operations will become more encouraging than they are. Success can only be looked for if the propriety of surgical interference is considered so soon as the presence of carcinoma is reasonably suspected. Even where removal of the disease proves to be impossible the performance of a gastro-enterostomy has often afforded great relief to

symptoms and has prolonged life. In cancer of the cardiac opening a gastrostomy is indicated when the difficulty of swallowing becomes great, and will, under these circumstances, if the operation is immediately successful, prolong life; it should not be postponed until the patient is exhausted. Apart from surgery, the means at our disposal are the use of liquid, nutritious and non-irritating diet, which must in the main be composed of milk, eggs beaten up, soup, gruel, milk tea, coffee made with plenty of milk, or cocoa, and if any alcohol is necessary a little good champagne.

In order to relieve the pain it may be necessary to give opium in the form of hypodermic injections of morphia ($\frac{1}{6}$ to $\frac{1}{3}$ grain), and if, as is often the case, there is some gastritis the same remedies should be employed as in chronic catarrh (see p. 54). Some writers praise highly the use of bitters, especially of condurango, which was at one time vaunted as a cure for cancer of the stomach; it is now merely regarded as a stomachic bitter in the same class as calumba, quassia, and gentian.

Dilatation of the Stomach.—Dilatation of the stomach may be (*a*) primary or (*b*) secondary. Primary dilatation is often called atonic, which is a very proper name for it, as it is caused by atony or want of tone in the muscular wall. This condition may occur in a transient form after fatigue or shock, or more permanently after serious illnesses or accidents, or a general breakdown in health from such causes as prolonged lactation, insufficient food, persistent overwork, or want of sleep. We meet with it in women who have been devoted nurses during the long illnesses of relatives, less commonly among professional nurses, as they are not so likely to work both night and day and are not subjected to the same mental strain, and very commonly in women of the poorest class. Secondary dilatation is due

to obstruction from simple or malignant stricture of the pylorus, perigastric adhesions, the pressure of tumours, or kinking of the duodenum from the dragging of some viscus, such as a loose kidney.

The diagnosis of dilatation of the stomach is made most readily and satisfactorily by the exhibition of the powders of bicarbonate of soda and tartaric acid described on p. 6, but, for the purposes of treatment, we must distinguish between the primary and secondary varieties. This can be done by looking for evidence of obstruction, of which the chief are food stasis after eight hours (see p. 7) and peristaltic waves. Peristaltic waves in emaciated persons may be easily seen travelling across from left to right, or there may be retro-peristalsis, where the wave travels in the opposite direction. These are comparatively quick movements, but, when the stomach has been distended by CO_2, it is sometimes possible to notice a slow peristaltic wave, visible even when there is not a great loss of flesh, but where the distended stomach can be recognised as a rounded swelling; in these cases the swelling gradually flattens to the left of the middle line and bulges out to the right, then flattens to the right and bulges to the left. These changes can be seen if the surface of the abdomen is watched for a few minutes, but their detection is rendered easier by keeping the eyes of the observer nearly on a level with the surface of the abdomen. Persistent vomiting is suggestive of the presence of obstruction, but may be the result of gastritis.

The prognosis of primary dilatation depends upon its duration, or, perhaps it would be more accurate to say, upon the duration and curability of the condition upon which it depends.

Treatment of Primary or Atonic Dilatation.—As this condition depends, as a rule, upon serious derangement of

the general health, it is of far more importance to use means to improve this than to apply any local measures to the digestive organs.

The prognosis of primary dilatation depends upon its duration, or, perhaps it would be more accurate to say, upon the duration and curability of the antecedent conditions. Where it is complicated by gastritis this must be treated as already described (*vide supra*, p. 52). In general, we should aim at giving relief from work and worry with good and abundant food and change of air to a bracing place. It should be borne in mind that sea air is often not bracing; this is especially true of the south and west coasts of England during the summer and autumn months; these patients may do better at inland stations like Buxton. In many cases it is necessary to give prolonged rest in bed by a course of Weir-Mitchell treatment with massage and faradism, and it is desirable not to hold out any prospect of a permanent cure being effected in less than three months. Galvanism and high frequency currents are both recommended as aids to this method, but I have not been impressed by their results; in cases where benefit has resulted, it was not more than I have seen where no such means were used, while, in cases in which the usual plan had not been successful, the addition of galvanism and high frequency currents did not produce any better effect. The diet may need to be modified where there is gastritis, but not on account of the dilatation; if the patient is going about, and, as is commonly the case, there is complaint of pain or oppression after food, she should be made to lie down after each meal until these symptoms disappear.

As these stomachs are always able to empty themselves, there is no need to use the stomach tube.

Medicinal tonics are always of service, especially the acid mixture (No. 6).

These patients are very commonly constipated, and require the regular use of an aperient. If they are going about, it is better to avoid giving them saline aperients, which often seem to increase the feeling of exhaustion, but small doses of cascara, aloin, or senna suit them better (see *Constipation*).

Treatment of Secondary Dilatation.—As this form of dilatation is due to structural changes which are not readily susceptible of modification by medicinal means, their treatment must be surgical. Klemperer's thiosinamine treatment (see p. 46) may be tried for a few weeks, but should not be unduly prolonged when surgery is ready and able to effect a cure. It is only in cases where surgical aid is refused that the case should be treated by the stomach tube, but if, in spite of our advice, the patient obstinately refuses the relief of an operation, he should be taught the use of the stomach tube, with which he should empty and wash out his stomach once a day. This should be done either the last thing at night or the first thing in the morning; the advantage of the latter time is that it gives a longer opportunity for the passage of food through the pylorus, but, on the other hand, it also allows the contents of the stomach to remain unduly long in contact with the gastric mucous membrane, thereby frequently setting or keeping up gastritis, so that, on the whole, it is preferable to use the tube the last thing at night. Secondary dilatation may, of course, be complicated by gastritis, and may call for appropriate treatment by diet and drugs.

Perhaps the most serious complication of dilated stomach is tetany, although it is fortunately rare, but of 25 recorded cases no fewer than 19 were fatal. The most successful treatment is gastro-enterostomy, but the other means that have been tried are infusions of enemata of normal salt

solution (7 per 1,000), enemata of chloral (120 grains), and morphia hypodermically ($\frac{1}{6}$ to $\frac{1}{3}$ grain).

Hyperchlorhydria, Hypersecretion, Gastro-Succorrhœa.—These conditions are frequently met with in association with, and depending upon, chronic organic disease, such as old-standing ulcer and chronic gastritis, and, when this is the case, their treatment should be the same as for the parent disease. The stomach tube is sometimes of service in relieving the discomfort caused by hypersecretion of gastric juice, as shown by pain, heartburn, and acid eructations. The antacid mixture (No. 5) or the olive oil mixture (No. 11) should be tried in the hope of diminishing the secretion. The diet should be bland, free from salt and condiments, and contain a good deal of fat and proteid (see p. 68). Milk, well diluted with Vichy water or lime water, may be tried first, and solid food (minced meat) added by degrees. As the digestion of starch is greatly interfered with, little should be given, and what amount is necessary should be in the form of toast or rusk, or malted foods.

(*b*) Constitutional Diseases.

Atonic Dyspepsia.—This condition is very common in this country, especially among women of the poorer class. It has its origin in debility, however caused, and may last for years. It is greatly dependent upon external circumstances; for example, during a holiday, with relief from all work and worry, the patient often digests marvellously well and feels in good health, but soon relapses after a return to the usual mode of life. It is also common to see great improvement take place where advancing years bring comparative prosperity with relief from anxiety, but perhaps this improvement may be also partly due to the

diminished excitability of the nervous system, which is happily often one of the accompaniments of the later years of life. In the initial stages the motility of the stomach may be chiefly, if not solely, affected; but, after a time, there may be also diminished secretion with deficiency or absence of free hydrochloric acid in the test breakfast, while there often are temporary intercurrent attacks of sub-acute gastritis. These patients almost invariably complain of pain in the epigastrium or under the left breast or between the shoulders, but on inquiry it is, as a rule, more a dull aching than a severe pain, and is often merely a sense of oppression; there is generally flatulence, and the bowels are usually confined; any other symptoms are due to complications. The chief objective signs are loss of flesh, which may often be considerable, and dilatation of the stomach with gastroptosis, readily demonstrated by distension with CO_2. The examination of a test breakfast generally shows deficiency of hydrochloric acid, but the other results are, as a rule, normal; pepsin is rarely absent.

Treatment.—The rational treatment of this condition by removal of the cause is often, unhappily, beyond our power, but, where it can be obtained, we should prescribe rest, such as can often only be obtained by leaving home, with consequent separation from the work and worry of business and domestic life. More obstinate conditions call for a Weir-Mitchell course, which should be for not less than three months. The diet should be an abundance of simple digestible food suited to the patient's taste; these are eminently unsuitable cases for strict regimen; they are apt to starve themselves, to follow every quack system, and to eat every patent food, but it may be desirable to warn them against indigestible food, and, if gastritis be present, a diet suitable for that condition (see p. 53) should be ordered.

The most useful medicine, after any gastritis has been

allayed by the treatment recommended on p. 53, is the acid mixture (No. 6), together with a vegetable aperient, of which cascara is perhaps the most generally suitable.

The remarks upon the employment of electricity in its various forms, which are made under the heading of atonic dilatation, apply equally here. I have seen no good results from it beyond such as may be explained by suggestion, which are often seen to follow the application of any new remedy in cases of this description.

Phthisical Dyspepsia.—The etiology of the dyspepsia of phthisis no doubt depends upon the constitutional disease. In the earlier stages, the patient complains of discomfort and distension, while pain is rare and vomiting exceptional, and an examination of the stomach contents shows excess of hydrochloric acid. In the second stage, the symptoms are often of atonic dyspepsia with deficiency of hydrochloric acid, and, in the third, there is chronic gastritis.

The treatment of these conditions does not differ from that given when they are met with apart from tuberculosis.

(*c*) Functional Diseases.

Hyperacidity.—There are cases of hyperacidity, Reichmann's disease, or gastro-succorrhœa, which are purely nervous, the attacks coming on under the influence of pressure of business, excitement, or worry, the symptoms being pain in the stomach, coming on some hours after a meal and relieved by food, and frequent regurgitation of intensely sour fluid into the mouth. As has been already explained, it is often difficult to prove the presence of this condition by estimating the total acidity of a test breakfast, as the excess seems to be by no means constant. The condition can only be differentiated from secondary hyperacidity depending upon organic disease, by the history and the absence of other signs or symptoms of ulcer or gastritis.

The *treatment* of nervous *hyperacidity* is by no means satisfactory, as it is often difficult or impossible to remove, or at any rate to prevent, the recurrence of the exciting cause. Everything possible should be done to improve the general health, but these patients often give a history which shows that they have been subject all their lives to nervous ailments, and it is beyond our power to effect any radical change in their constitutions. Rest and change of air are, of course, of value, and such cases derive benefit from a course of treatment at Vichy. So long as the attack lasts, the diet must consist chiefly of meat and other albuminous foods with fat, no salt, and a minimum of starchy food. They often do well on a Salisbury diet of lightly-cooked minced meat, with hot water. Alkalies with bismuth should be given before each meal, such as the antacid mixture (No. 5).

According to Pawlow olive oil when introduced into the stomach before meals diminishes and delays the secretion of gastric juice, but the quantity of oil used was 100 c.c., that is, $3\frac{1}{3}$ ozs. It has been used in much smaller doses (from 1 drm. to $\frac{1}{2}$ oz.) to check hypersecretion, not only in simple neuroses, but also where it has been associated with gastric ulcer and other organic conditions. The good results that have been recorded suggest the desirability of giving a further trial to this treatment (see *Olive oil mixture*, No. 11).

The use of the stomach tube is indicated in those cases where relief cannot be obtained in any other way, as by its means life may be made tolerable.

Some authors speak highly of belladonna and its alkaloid atropine as possessing the power to diminish the secretion of gastric juice, but in practice they are not trustworthy. Bromide of potassium is also theoretically indicated, but is not of much value.

Sub-acidity is very commonly seen in cases of neurasthenia, and constitutes one of the symptoms of atonic dyspepsia already described (see p. 65).

Anacidity, or entire absence of hydrochloric acid, is an extreme degree of failure of gastric juice associated with neurasthenic conditions, but has occasionally been met with in people who have no marked symptoms at all.

The *treatment* of anacidity aims at securing the passage of food as soon as possible into the bowel where digestion can be effected. As already explained, the attempt to give artificial digestive agents is not satisfactory and is superfluous.

Perhaps the best thing to do is to give the acid mixture (No. 6) after meals in order to disinfect the gastric contents and to stimulate the stomach to discharge its contents.

Gastralgia.—Gastralgia is a word which is often used very loosely, but should be restricted to those cases in which pain is independent of organic disease. There are two well-marked types, of which the first is relieved by food and the second comes on directly after food. The first is like the pain of hyperacidity, and can only be distinguished from it by the absence of regurgitation of sour fluid. It occurs in persons of nervous temperament; is more common in men than in women, and may be brought on by excitement, annoyance, or fatigue. The pain is severe, situated at the pit of the stomach, aching, and associated with general mental depression. It is probable that the pain from which Carlyle suffered was of this description. It is relieved by alcoholic stimulants or by a good meal, and is made worse by tea or hot water. These points are characteristic and aid in the diagnosis. The most efficient treatment undoubtedly is morphia or heroin in small doses. Fifteen to twenty minims of the B.P. solution of morphia or an equivalent solution of heroin diluted in water, and coloured, or covered

by the addition of a few drops of compound tincture of cardamoms, give immediate relief. Small doses of chloral hydrate and antipyrin have been recommended, and may be tried where the patient is intolerant of morphia or heroin. The condition is one which is often seen in strenuous workers, who, if they could be persuaded to take life more easily, would lose their liability to these attacks; they are generally aware that during a holiday they are entirely free from them, but it is difficult to persuade them to alter their habits. The disease tends to diminish and disappear after middle life.

The second type of gastralgia is especially associated with chlorosis, and is extremely liable to be confounded with gastric ulcer. The pain comes on immediately after food and is relieved by vomiting; but there is no hæmatemesis, and it is rapidly cured by rest in bed and the administration of iron. It is generally necessary to give food at first in small quantities, such as 1 oz. of milk every hour; and to coax the stomach to bear ordinary diet by easy stages, much as in the case of gastric ulcer. The aperient iron mixture (No. 7) given in cases of gastric ulcer should be supplemented by pil. ferri (B.P.) or Oppenheimer's bi-palatinoids of ferrous carbonate, of which two should be given three times a day. The prognosis of these cases is good, and the recovery takes place rapidly and completely.

The gastric crises of locomotor ataxy, consisting as they do of violent pain in the stomach brought on by swallowing any kind of food or drink, even simple water, undoubtedly must be classed under the heading of nervous gastralgia. The diagnosis can only be made by recognising the other symptoms and signs of the presence of locomotor ataxy. The treatment consists in withholding all food and drink by the mouth and the hypodermic injection of morphia. If necessary rectal feeding may be employed.

Cardiospasm has been described as nervous stricture of the œsophagus (see p. 48) and needs no further reference here.

Pylorospasm may possibly occur in association with ulcer and hyperacidity, but is a condition of which we know little and cannot diagnose with precision. Our belief in its existence is founded mainly upon the existence of certain cases of simple stenosis of the pylorus due to hypertrophy of the muscular wall, which look as if they had been caused by a persistent spastic condition of the ring muscles. Some writers attribute much of the pain associated with stomach diseases to this spasm, but the evidence produced in support of this view is not conclusive.

Nervous Vomiting includes vomiting associated with gastralgia, but may occur in some cases without pain. In most cases of the latter class the patient is hysterical and the vomiting more or less wilful. We are often told that the patient vomits everything she takes, but she looks well nourished, and, on careful observation, it will be found that the amount of vomited matter represents only a small proportion of the food swallowed. In some cases food is regurgitated before it actually reaches the stomach.

The treatment of hysterical vomiting is by isolation, and where the food is regurgitated from the œsophagus it may be necessary to threaten to feed with the stomach tube; as a rule the threat is sufficient.

Sea sickness is probably a form of nervous vomiting, but its true pathology remains obscure. The best treatment for sea sickness is the recumbent position and a dose of some hypnotic to induce sleep, such as chloral hydrate (20 grains), sulphonal (15 grains), trional (10 grains), or veronal (7 grains).

Anorexia.—Complete loss of appetite may be met with in connection with organic disease of the stomach, and is

especially characteristic of cancer, as in other organic diseases the patient desires to eat, but is afraid to do so on account of the discomfort or pain. Many nervous patients cut off one article of food after another in the attempt to gain relief from pain, and in this way frequently suffer from partial inanition, but they have not lost appetite. In true *Anorexia nervosa* there is complete absence of desire for food; these patients make away with food given them by hiding it, putting it in the fire, or throwing it out of the window, and may starve themselves to death. The treatment for this condition is isolation and forcible feeding with, or without, the stomach tube, which is not often necessary, as the patient will generally swallow if fed with a spoon, and, when isolated from anxious friends, soon eats normally. These cases do well under the Weir-Mitchell treatment, but may relapse when they return to their homes.

The opposite condition of a voracious appetite is never seen in organic diseases of the stomach, although in gastro-succorrhœa there may be craving for food to allay pain, but this gives rise to a desire for food between meals rather than to an abnormal appetite. The quantity of food eaten at one time is a matter of habit. Uncivilised men, whose supplies of food are irregular and uncertain, eat food in enormous quantities when the opportunity occurs, but civilised people vary between wide limits in this respect. There are two conditions under which excessive quantities of food may be taken. The first is termed Bulimia, in which there is an abnormal desire for food, with a persistent sense of hunger; the other is called Akoria, and is characterised by the absence of the feeling of satiety, so that eating may be continued indefinitely.

Bulimia, or excessive craving for food, is met with in women, especially in pregnancy and hysteria; in children

and others, it is sometimes connected with the presence of intestinal worms, and, in both cases, with gout, epilepsy, neurasthenia, diabetes, cerebral tumour, Graves' disease, and insanity. The *treatment* of Bulimia is first to remove the cause, if this is known; secondly, to regulate the quantity of food; and, thirdly, to allay the craving by sedative drugs, such as morphine, cannabis indica, or bromide of potassium; the use of cocaine and arsenic has also been suggested, but some cases prove rebellious to all remedial treatment.

Akoria, or the absence of the feeling of satiety, is especially seen in gouty persons, who, in consequence, become very stout, and it must be reckoned among the common causes of obesity. The treatment is simple, as it is merely necessary to regulate the quantity of food taken. This causes no distress to the patients, as does a similar restriction in cases of Bulimia, as there is no craving for food and there is at most a habit of eating large quantities. The difficulty is that these patients are apt after a time to return to their former habits, so as to suggest that they get a certain amount of pleasure from the act of eating, although they admit that, after having had a reasonable amount of food, they are no longer actually hungry.

Stomach Vertigo.—Giddiness is frequently associated with derangement of the stomach, and is most commonly met with in connection with an overloaded stomach, the symptom being removed when the stomach is emptied by vomiting; but it sometimes depends upon sub-acute gastritis, and can then be remedied by suitable medicinal treatment and attention to diet. It is characteristic of this type of vertigo that it is made worse by lying down. "Nightmare" is an attack of stomach vertigo during sleep.

The giddiness felt on looking down from a height is caused by stomach derangement, or it may be said that

those who suffer from this symptom have not perfectly sound digestion.

Agoraphobia is of two kinds—(*a*) the dread of open spaces, which prevents a man from walking alone across an unfurnished room or an empty square, although the companionship of even a little child will remove the feeling, and (*b*) the fear of crowded bustling streets.

Claustrophia is the dread of being shut up in a room, a theatre, or a church.

The *treatment* of these conditions, so far as it is possible, is by correcting any errors of diet, giving suitable remedies for any gastritis that may be present, and diminishing the nervous excitability by such sedatives as bromide of potassium. Ewald speaks favourably of chloral in 10-grain doses for Agoraphobia. They are often associated with neurasthenia, and are benefited by rest, change of air, and all such means as improve the general health.

(*d*) Indications for Operative Interference in Diseases of the Stomach.

During the last few years surgery has intervened with brilliant results in the treatment of diseases of the stomach, which were regarded only a few years ago as peculiarly the province of the physician; but there is some difference of opinion as to the extent to which this intrusion is justified, and, while surgeons complain that certain physicians take up an unfairly hostile and absolutely conservative attitude, physicians retort that the claims of certain surgeons are altogether unjustifiable, and go beyond anything that is warranted by the results that have been obtained. Under these circumstances it is highly desirable that the practitioner should have some guide to enable him to give sound advice to his patients.

It ought to be fully and frankly admitted that surgery

has been able to cure cases of stomach diseases previously regarded as incurable, and that it has prolonged many lives, even where it has failed to cure; further, that it has rescued many patients from conditions of chronic suffering, which, if they do not threaten death, render life a burden. It ought to be recognised that stomach diseases are common ground upon which the physician and surgeon should meet, and that it is the duty of every practitioner, who is himself unable to perform the necessary surgical operations, to associate himself with someone who possesses this skill, and to call him into consultation in all cases which present symptoms that can be relieved by surgical interference.

There are certain conditions which, it may be presumed, are universally admitted to require immediate surgical aid. These are:—(*a*) Impermeable stricture of the œsophagus, where the patient is unable to swallow sufficient food to maintain life; (*b*) perforated gastric ulcer; (*c*) sub-phrenic abscess; (*d*) foreign bodies in the stomach; (*e*) pyloric tumour with symptoms of pyloric obstruction.

The following conditions are more open to difference of opinion:—(*f*) Hæmorrhage from the stomach, if recurrent, suggests the propriety of surgical interference, in order, if possible, to secure the bleeding point; the objection to it is that when the stomach has been opened it is frequently impossible to find the source of the bleeding, but sometimes gastro-enterostomy is followed by good results in spite of the failure to secure the bleeding point. This difficulty induces many surgeons to refrain from operating and experience justifies their reserve, for, as a rule, the application of an ice-bag to the epigastrium and rectal feeding are followed by recovery. Where the hæmorrhage comes from a duodenal ulcer, gastro-enterostomy is more clearly indicated, as these cases do badly when left to themselves.

(*g*) *Gastric and Duodenal Ulcer.*—Gastric ulcers generally

recover under medical treatment. Indications for surgical aid are:—(1) perforation; (2) recurrent bleeding, although, as just explained, it is often better not to operate; (3) duodenal ulcer; (4) where the pain is intense and cannot be relieved by ordinary medical means; (5) where there is persistent vomiting which does not yield to medical treatment, and where probably the ulcer is situated near the pylorus and is associated with great inflammatory thickening causing obstruction.

(*h*) *Dilatation of the Stomach.*—Dilatation of the stomach is not by itself an indication for operative interference; but where there is stasis—that is to say, where remains of food can be found in the stomach eight hours after a meal—this may be taken to indicate stenosis of the pylorus and justifies us in advising the operation of gastro-enterostomy. The complication of tetany justifies and indeed urgently calls for gastro-enterostomy. Simple dilatation, however great, in which the stomach empties itself in less than eight hours does not justify operation; and the experience of nearly all surgeons who have operated in these cases is unfavourable, the patient's condition not being improved.

(*i*) *Hour-glass Stomach.*—This condition only calls for operation where it gives rise to symptoms of obstruction and stasis.

(*j*) *Hyperchlorhydria.*—Hyperchlorhydria is frequently a symptom of organic disease and may be associated with pyloric stenosis and stasis. Where this is the case gastro-enterostomy is indicated, but where the hypersecretion is a pure neurosis, surgical interference does no good.

(*k*) *Chronic Gastritis.*—Chronic dyspepsia and gastralgia are not conditions which in themselves require surgical treatment, and surgical interference should not be permitted, unless they are associated with pyloric stenosis or spasm giving rise to stasis.

(*l*) *Cancer.*—Surgical operation in cases of cancer of the stomach has in the past ten or fifteen years been followed by such remarkable results that it deserves greater encouragement. It is obvious that only early operations are likely to be successful, and therefore it is to be desired that practitioners should keep their minds open on the subject and should call for surgical assistance as early as possible. The real difficulty is in making an early diagnosis, but as it becomes more the custom to call in surgical assistance for pyloric obstruction, without reference to its cause, it is to be hoped that many early cases of cancer will be recognised and relieved. It is remarkable that the radical operation, in the hands of German surgeons, gives positively a lower mortality than gastro-enterostomy; that is to say, out of 563 cases of the latter operation there were 216 deaths or a mortality of 38·36 per cent., while of 325 cases of pylorectomy there were 34 deaths giving a mortality of 32 per cent. Moreover, it must be remembered that surgeons complain that such a large proportion of the mortality which has followed their operations for cancer has been due, not to those especial dangers against which surgeons must guard their patients, but from want of strength on the part of the patient to support the operation.

IV. DISEASES OF THE INTESTINE.

(*a*) Organic Diseases.

(1) **Acute Catarrh.**—Acute catarrh of the intestine gives rise to diarrhœa, and comes under medical notice only in its severer forms, but the inflammation of the mucous membrane may be so intense as to cause ulceration and even bloody stools. Its chief causes are the swallowing of indigestible articles of food, infection, irritant poisoning, especially by food poisoning (ptomaines), and catching cold. Perhaps the most common example of indigestible food is unripe fruit; infection is the cause of the summer diarrhœa which prevails in our great towns in warm weather; the view is generally accepted that the symptoms are usually the result of irritation by toxins formed in the cavity of the intestine and not of inflammation of the wall of the bowel due to bacteria which have penetrated its substance; hence the condition is one that tends to cure itself. Irritant poisoning may be caused by partly decomposed fruit, or fish, or meat, but may also be the consequence of the accidental or criminal administration of such poisons as arsenic or antimony, or the ignorant use of drugs to get rid of worms or to procure abortion; the influence of cold is principally seen in debilitated persons, where the mucous membrane is readily impressionable.

Fever is met with only in cases of infectious origin, and may then rise to 104° or more. There may be a good deal of general depression and weakness, and there is usually more or less pain across the epigastrium in the line of the colon, with tenderness on pressure. Nausea and vomiting are not infrequent, and jaundice may occur in the later

stages. The stools are often alkaline, thin, and more or less liquid; they may contain mucus and blood, or, perhaps, old hard scybala. The smell is at first offensive, and the colour may be green, brown, yellow, or, if jaundice is present, a light greyish-white. Under the microscope, besides remains of food, epithelial cells with red and white blood-corpuscles may be seen.

The *treatment* involves, in severe cases, rest in bed, especially if there is fever or great weakness. The simplest diet is the best, such as equal parts of milk and lime water or milk whey. If the stomach is irritable, only small quantities should be given, and, if a stimulant is needed, iced champagne may be tried. After the diarrhœa and pain have disappeared, small quantities of solid food may be added, but hot drinks should be cautiously administered, as they may bring back the purging. Bland animal food is often better tolerated than starchy food — for example, cold chicken-broth or chicken-jelly—while baked or boiled custard puddings are preferable to gruels and invalid cereal foods. As convalescence progresses, ordinary simple diet may be gradually resumed, care being taken that it is bland and well-cooked, but, if the teeth are defective, meat must be minced or pounded.

With respect to drugs, some prefer to commence treatment by administering ½ oz. to 1 oz. of castor oil in order to clear out the irritating matter, but, when the case comes under notice, the whole of the original contents of the intestine have generally been evacuated, and the indication is to check peristalsis and relieve pain. For this purpose we employ bismuth with alkalies and opium or morphine, as in the bismuth and opium mixture (No. 9).

In many cases the opium can be dispensed with, and simple mistura cretæ (B.P.) may be all that is required.

Dilute sulphuric acid is useful in the treatment of

infectious diarrhœa in adults, but it should be given freely, 10 or 15 minims in 1 oz. of water every four hours.

Severe pain in cases of poisoning often calls for the local application of fomentations to the abdomen and the use of morphia by hypodermic injection in sufficient doses.

Where collapse occurs and the pulse is thready, ½ pint to 1 pint of normal salt solution, at the temperature of the body, may be introduced under the skin of the flank.

Small iced-water enemata (1 to 2 ozs.) are effectual in the treatment of infantile diarrhœa, but should be repeated after each movement of the bowel.

The *prognosis* is good, except in the case of very young or very old persons, or where the disease is due to irritant poisoning.

(2) **Chronic Catarrh.**—Chronic catarrh of the bowel occurs frequently in elderly people in connection with chronic gastritis or disease of the heart, liver, or kidneys. In the first-named condition it may be dependent upon defective teeth or the abuse of alcohol. The symptoms are looseness of the bowels, which may act three or four times a day, want of appetite, flatulent distension of the abdomen, and some degree of local pain or tenderness on palpation. On examination, the abdomen is usually distended and the colon is tender throughout its entire course. It not uncommonly happens that periods of constipation alternate with diarrhœa; the appearance of the stools varies with the intensity of the affection, but it is only in the worst cases that they are liquid and contain blood and mucus.

The *treatment* is to relieve, as far as possible, the primary condition. Where there is abuse of alcohol, or when curable gastritis exists, much may be hoped from judicious treatment; but, in the presence of advanced organic diseases in heart, liver, or kidneys, not much can be

expected from our available means, except by controlling diarrhœa and relieving pain.

It is seldom that these cases require treatment in bed or the strictness of absolute diet. The patients are generally anxious to continue their usual mode of life, so far as is possible, and this may generally be permitted, provided they will submit to certain restrictions.

As many cases in elderly people are due to swallowing imperfectly masticated food, it is, in the first instance, necessary to look to the teeth, and, if these are defective, until their place can be supplied efficiently all meat must be minced or pounded so as to prevent lumps reaching the stomach, and thence the bowel. Inquiry must be made carefully into the question of alcohol, and only light wine well diluted with mineral water, or very weak whisky and water, allowed.

In any case, it is necessary to forbid all uncooked fruit, uncooked vegetables, brown bread, porridge, pastry, cane sugar, pickles, and the less digestible meats, such as pork, veal, goose, duck, salmon, and salted and smoked or preserved meat and fish.

The day should be begun by sipping slowly from 4 to 5 ozs. of hot water containing from 20 to 30 grains of sulphate of soda. This quantity of salt may be diminished or increased according to the state of the bowels, as it is desirable never to allow constipation to occur, but rather to maintain a moderate degree of freedom in the stools.

These cases derive benefit from a course of treatment at Vichy, Royat, Châtel-Guyon, Neuenahr, or Carlsbad.

Should there be troublesome diarrhœa, it may be necessary to have recourse for a time to astringents, such as the bismuth and opium mixture (No. 9).

The *prognosis* depends upon our recognition of the cause and our ability to remove it.

(3) **Mucous Colitis.**—The condition which is sometimes called *membranous* or *mucous colitis* has received a good deal of attention in recent times, and has been accorded an exaggerated amount of importance. We do not know precisely what are the conditions under which catarrh of the colon is accompanied by the copious secretion of tenacious mucus which gains for it this specific name; but although it is often met with in hysterical and neurasthenic patients, it is a mistake to suppose that it is solely dependent upon functional nervous affections, and it is even a greater mistake to regard these nervous conditions as dependent upon the affection of the bowel. In a recent work Jouaust claims to have caused a glairy hypersecretion of the intestinal mucous membrane by various aseptic traumatisms of the abdominal organs, so that he considers it to be a secondary condition depending upon disease of some neighbouring organ, such as the liver, the kidneys. or the appendix, although he recognises the importance of what he calls the "neuro-arthritic" constitution.

The term "membranous" is unfortunate as no true membrane is ever passed. The ribbon-like masses which are sometimes spoken of as membrane are moulded by passing through the sphincter, and are always composed of mucus and catarrhal products.

The mucous secretion alternates with periods of constipation, and is associated with the discharge of hard scybalous masses, which are the cause of the irritation. There may be marked spasm of the colon accompanied by severe pain. This spasmodic contraction of the colon can be readily felt; the contracted part feeling like a piece of garden hose, and is the seat of active peristaltic movements.

The *treatment* in general is that of chronic catarrh of the colon, but where there is spasm or pain enemata of olive oil (8 ozs. at 95° F.) or glycerine may be used with

advantage. If the pain is intense hypodermic injections of morphia may be the only means by which relief can be afforded.

In obstinate cases electricity may be tried, particularly in the form of mild galvanic currents (5 to 10 M.A.) with large electrodes.

(4) **Ulceration.** — Ulceration of the intestine may be either (*a*) catarrhal, (*b*) diphtheritic, (*c*) tubercular, (*d*) syphilitic, or (*e*) cancerous.

Catarrhal ulceration occurs in association with the catarrhal inflammation that has already been described, but there are no means by which during life this complication can be recognised, although we may suspect it where we find blood or pus in the stools, or where the diarrhœa is unusually intractable.

Diphtheritic ulceration is met with in dysentery and also in the terminal stages of certain constitutional diseases, such as Bright's disease and diabetes. The so-called "ulcerative colitis" of Hale White appears to be a superfluous synonym for sporadic dysentery, caused by the Shiga bacillus.

Tubercular ulceration, as a rule, occurs in the later stages of pulmonary phthisis, and sets up severe diarrhœa which resists all treatment and rapidly reduces the patient's strength, so that it plays an important part in bringing about the fatal termination of the case.

Syphilitic ulceration of the intestine is usually unattended by symptoms, but may give rise to adhesions or perforation into neighbouring viscera, such as the bladder, or to stricture of the gut. When it attacks the rectum there may be pain on defæcation, and blood and mucus may be seen in the stools.

Cancer of the bowel causes symptoms which vary according to its position. There may be troublesome diarrhœa

or frequent desire to go to stool, with discharges of blood-stained mucus, and later on symptoms of obstruction. A tumour may or may not be felt through the abdominal wall, or the growth may be detected by rectal examination.

The *diagnosis* of ulceration of the intestine can only be made with certainty when blood and pus are found in the stools, and to detect them microscopical or chemical examination may be necessary. The particular form of ulceration must depend upon the history of the case and the presence of indications of constitutional disease. The presence of dysentery may be diagnosed by making use of the fact that a culture of the *Bacillus dysenteriæ* (Shiga) agglutinates when brought in contact with a drop of blood from a patient suffering from the disease. The secondary ulceration that occurs in Bright's disease and diabetes has usually been discovered *post-mortem*, and does not during life give rise to clinical symptoms.

The *treatment* consists in rest in bed in severe cases, with the administration of bismuth and soda combined with some preparation of opium (Nos. 8 and 9), and the irrigation of the bowel by warm (95° F.) boracic lotion. In some cases the colon has been opened in the right iliac region so as to permit of thorough and complete irrigation. The diet should be restricted at first to milk and lime water, or milk thickened with flour, and only gradually increased as the symptoms subside.

Typhlitis and Appendicitis.—While it is beyond question that many cases of appendicitis are preceded by attacks of catarrhal entero-colitis in which the cæcum shares, in the light of the experience of the last fifteen years it cannot be maintained that the group of symptoms which used to be called typhlitis is due to inflammation of the cæcum without the participation of the appendix; in other words, all cases formerly called typhlitis are really appendicitis.

The causes of appendicitis are obscure. In many cases we find a fæcal concretion, lying behind a stenosis of the lumen, and apparently rather a consequence than a cause of the chronic inflammation. True foreign bodies are excessively rare. Inflammation of the appendix is probably the result of a catarrhal inflammation of the cæcum, which becomes more virulent in the appendix, because, being a diverticulum, it is cut off from the general current which affords free drainage to the other parts and favours healing, but catarrh of the cæcum by itself causes no symptoms. This persistent inflammation sets up stenosis of the neck of the appendix, which, by shutting off its contents from the general cavity of the bowel, permits the bacteria located in it to become virulent, so that the ordinarily harmless *bacillus coli* may cause suppurative or gangrenous inflammation.

The *symptoms* are well known: pain and tenderness in the right iliac fossa, a tumour above Poupart's ligament, more or less fever, and constipation.

The *diagnosis* is easy when all these symptoms are present, but it is more difficult to know what value to assign to them, for there are great variations in the gravity of these cases.

The *prognosis* may be stated to be generally good in a first attack, but there are some rapidly explosive conditions in which nothing but the promptest surgical interference can save the patient's life. These often occur in children, for whom an expectant plan of treatment is more dangerous than for adults.

The *treatment* is of two kinds—(*a*) expectant or medical; (*b*) radical or surgical. It is permissible to follow an expectant plan of treatment in a first attack where the symptoms present no special severity and if the patient is an adult. This treatment should consist in poultices or

fomentations to the seat of the pain, if there is any, and the administration of a purgative, which may be either a full dose of calomel (5 grains) or Epsom salts (½ oz.). The diet must consist of diluted milk and light farinaceous food. If all goes on well, the patient must remain in bed until not only all pain and tenderness have disappeared, but no trace of tumour, or even thickening, can be felt above Poupart's ligament. If, after two or three weeks, any such thickening remains, an operation should be advised, as no patient can go about safely with an unresolved lump in this region. If, on the other hand, the case clears up completely, the patient may be dismissed as cured, and, in many instances, will remain well. In a certain percentage of cases relapse occurs, when the question of operation must be again considered. If, as is sometimes the case, the relapse is slight, the patient unwilling to undergo an operation, and the recovery apparently complete, the operation may be postponed, but, if there is a second relapse, the operation ought to be performed without further delay. In all acute cases with severe symptoms, and in all relapsing cases, the practitioner should insist upon operation, for he can never know what may be the precise state of things; where there is neither fever nor pain, and the tumour feels quite small, there may be an abscess on the point of bursting into the cavity of the peritoneum. A leucocyte count may help to decide in a doubtful case, but a negative result should not outweigh other indications for operating. It is, therefore, a relief when the operation has been performed and the appendix removed. It is not so satisfactory when the operator does not succeed in removing the appendix, which may not be due to want of skill, as it may be so matted together by old inflammation in the connective tissue behind the cæcum that it may be impossible to find it without making a greater

dissection than is justifiable; permanent recovery often follows these incomplete operations.

Stenosis, Stricture.—Narrowing of the lumen or obstruction to the channel of the bowel may be caused in many ways. The ileo-cæcal valve may be blocked by the impaction of a gallstone; or a hard indigestible body, such as a coin or false teeth, may have been swallowed accidentally or intentionally; or a fæcal mass may cause obstruction in the colon; or the pressure of such a mass may obstruct the duodenum; or the obstruction may be due to the contraction of a cicatrix following an ulcer, although this is rare; or as the result of a cancerous growth in the wall of the bowel; or by adhesion at the base of an ulcer which, in this way, more frequently causes obstruction than by the contraction of its cicatrix; or by adhesions or bands resulting from a previous abdominal operation; from disease of the pelvic organs, from intussusception, or from the strangulation of the bowel from an internal or external hernia.

In whatever way obstruction may be caused, the symptoms produced by it are more or less distension of the abdomen, interference with the passage of fæces and flatus, and ultimately vomiting, which may be fæcal; if unrelieved, it is generally followed by peritonitis. Except in those rare cases in which a spontaneous cure is possible and takes place, a fatal termination is inevitable, unless relief can be afforded by surgical means.

The diagnosis of obstruction is generally aided by the history of its comparatively sudden onset; where there is reason to suspect that the interference with the movement of the bowels is due to such a cause, the administration of purgative medicines should be avoided, as they can do no good, are almost certain to increase the pain, and may set up peritonitis. It is undesirable to give opium until we have arrived at a diagnosis, as its effect is to mask symp-

toms, and may induce the patient and his medical attendant to believe in an improvement which is illusory, and only leads to the loss of valuable time. There is no objection to the use of enemata, which should be so large as to clear out the bowel thoroughly below the obstruction, as by their means diagnosis is facilitated, for it may happen that the bowels continue to act for some time after obstruction is complete, owing to the discharge of fæces which had accumulated below the seat of the stricture. Moreover, an enema is the best way of breaking up and bringing away any hard masses of fæces which may be causing a block. The enema used may be simple soap and water, or soap and water with a tablespoonful of castor oil, or with a tablespoonful of castor oil and a tablespoonful of turpentine, or may be entirely composed of olive oil.

When the diagnosis has been established and enemata have failed to overcome the obstruction, surgical aid should be sought, and it may be desirable to do this without waiting to use enemata, if the diagnosis is clear, or the symptoms are severe, and peritonitis seems imminent. Wherever possible, the surgeon should endeavour to remove the cause of the obstruction, but as, in many cases, it is impossible to diagnose this accurately or to localise it, the only practical way to afford relief is to open the bowel above the obstruction and form an artificial anus.

Enteroptosis.—The falling downwards of the colon is often associated with a similar prolapse of the stomach, and occurs under identical conditions in neurasthenic individuals with relaxed abdominal walls. With these there may be more or less mobility of the kidneys, especially the right kidney. As is well known, great stress has been laid upon this condition by Glénard and his followers, who have endeavoured to establish that these displacements are the causes and not the consequences of the nervous

disorders with which they are associated. The proper treatment is to improve the general health, especially by a course of Weir-Mitchell treatment, followed by the use of a comfortable and efficient abdominal belt.

(*b*) Functional Diseases.

Intestinal Indigestion—Colic.—Hemmeter objects to the term "intestinal dyspepsia" as implying disturbance of digestion in which pepsin is a factor, and proposes the use of the words "intestinal dystrypsia" as a substitute. But "dyspepsia" in its origin had nothing whatever to do with pepsin, and was used long before the discovery of that ferment, therefore there can be no etymological impropriety in applying it to disturbances of digestion in any part of the alimentary canal. It is doubtful whether there is properly such a thing as intestinal dyspepsia. By gastric dyspepsia we do not mean failure, or even disturbance, of the chemical function of the stomach, but *discomfort during the act of digestion*, a condition which is more often associated with normal gastric chemistry than not. On the other hand, when the food has passed into the duodenum, whether digested or not, and whether in the duodenum it is further elaborated or not, it does not give rise to *discomfort*.

In the presence of any lesion of the liver or of the external bile apparatus the bile may be prevented from reaching the duodenum, with the usual consequences of jaundice and such impairment of intestinal digestion as may be due to the want of bile. Clinically we notice constipation and intestinal flatulence. In the rarer conditions of diseases of the pancreas, the effect on the intestinal functions is even less obvious. Fatty stools may be absent in advanced pancreatic disease. Possibly further study of the chemistry of fæces may supply the indica-

tions now wanting. The relations of pancreatic atrophy to glycosuria are well known, but there are no associated symptoms that can be called "pancreatic dyspepsia." Hemmeter and Kuhn have invented special tubes for reaching the duodenum, and propose to wash it out and withdraw the products of test meals, but after reading their descriptions of the results obtained one does not feel encouraged to imitate them.

The condition to which the term intestinal indigestion may be given with least impropriety is that in which griping pain comes on some hours after food. There may be constipation or diarrhœa, or the two may alternate. The seat of the pain in the epigastrium may suggest stomach trouble, but there are no gastric symptoms. This used to be called "colic," and there seems no good reason to supersede the old name.

It is most often associated with constipation and a weakened condition of the wall of the colon and of the abdominal muscles. Such attacks are most frequent in women, and are probably favoured by sedentary habits; obesity is a common cause.

Treatment.—These patients should be induced to take regular exercise, or, if this is impossible, they should have general and abdominal massage either by hand or by mechanical means (Zander apparatus). Where circumstances permit, a course of treatment at Marienbad is beneficial. If, as is often the case, the patient eats an excessive quantity of food, the diet should be limited in amount, and the use of vegetables and fruit containing much fibre (cellulose) should be forbidden.

The drug treatment must include the regular use of aperients (see *Treatment of Constipation*, p. 93). During the attack relief may be obtained by giving the castor-oil and opium mixture (No. 10), or 10 minims of the carmina-

tive tincture (B.P.C.), or 2 minims of the carminative drops (No. 16) taken on a lump of sugar.

Meteorism — Flatulence. — Flatulent distension of the intestine may, like that of the stomach, be in part due to the swallowing of air, as is the case in some forms of hysterical meteorism. But gas in the intestine is more probably derived from fermentative decomposition than in the stomach, because there is more opportunity for such gas-forming fermentations which are also liable to occur as a consequence of pancreatic digestion. The articles of food prone to favour fermentations are those which contain much cellulose; but at least two factors must co-operate in order to produce flatulent distension of the bowel. The first of these is fermentation and the second stagnation. So long as the intestinal contents move onward with normal rapidity there is no undue accumulation of gas, so that these symptoms are necessarily associated with, and dependent upon, constipation, or the more serious forms of intestinal obstruction.

Successful treatment depends on overcoming constipation rather than on preventing fermentation, especially as articles of food containing cellulose are those which excite peristalsis. In that form of constipation which is associated with spasmodic contraction of the colon, it is necessary to avoid giving stimulating food, and we must endeavour to overcome the spasm by the use of sedatives. Enemata of warm olive oil are, perhaps, the best means of dealing with constipation due to spasm. Belladonna is invariably recommended because of its physiological effects, but is disappointing; still the menthol and belladonna pill (No. 20) may be tried.

Constipation.—As has been already pointed out, the regular daily movement of the bowels is of chief importance in the maintenance of good digestion and freedom from

discomfort. That disorders of this function are exceedingly common is unquestionable, and may be attributed to the sedentary habits and highly prepared food of civilised men and women. The important part played by sedentary habits is shown by the greater frequency of this trouble in women than in men, but another cause may be found in the fact that girls seem to be more in the habit of neglecting the calls of nature than boys. Both boys and girls at the school age are liable to regard these matters with indifference and need supervision in this respect. Constipation may occur at any age, for even infants suffer from it, and it obviously depends to a considerable extent upon the nature of the food. Infants may become constipated by the milk being too rich in curd and deficient in sugar, which is always the case with cow's milk as compared with human milk, and may be remedied by dilution and adding milk sugar. The diet of children should contain a reasonable quantity of cellulose in the form of vegetables, fruit, brown bread, and porridge; and even in adult life there is generally a need for a certain proportion of these articles of diet. Among the poorer classes scarcely any vegetables and fruit are eaten except potatoes and bananas, which contain sugar and starch but no cellulose. The alterations that have taken place in the diet of the poor constitute a national danger, but the change has gone on the lines of giving the maximum of nutriment with the least trouble to the recipient either in cooking or mastication, and the importance of giving a due proportion of innutritious food has been not unnaturally overlooked. In old age constipation is the result of the enfeeblement of the muscular wall of the intestine from fatty degeneration of the muscular fibres; such a condition is troublesome to treat as degenerated muscles cannot respond readily to any stimulus.

Certain articles of food cause constipation, such as milk,

tea, coffee, and hard water; also many drugs, notably iron, bismuth, magnesia, alum, lead, chalk, copper, opium, catechu, kino, and tannin. Some of the latter may be taken accidentally with food, but others are given for medical purposes when their constipating action may require counteracting by the addition of some laxative to the prescription, such as glycerine or sulphate of magnesia or rhubarb.

Constipation commonly results from a sluggish peristaltic movement in the bowel, in consequence of which more or less fæcal stasis results, and the fæcal masses become harder, drier, and more difficult to move. Ultimately these dry hard masses give rise to considerable trouble by accumulating in any part of the bowel, or by becoming impacted in the rectum when they may have to be removed by mechanical means. In other cases, notably in association with neurasthenia, the colon becomes irritable, and constipation is associated with painful spasm of the bowel. We have, therefore, to recognise these two types of constipation; the first associated with atony and the second with spasm.

In considering the treatment of constipation we must keep in mind this division into the two types of (*a*) atonic, (*b*) spasmodic; and the treatment of each must be considered under the head of (1) prophylaxis; (2) hygiene and general diet; (3) special diet; (4) mineral water cures; (5) physical exercises, electricity, and mechano-therapeutics; (6) drugs administered by the mouth; (7) enemata and drugs administered by the rectum; and (8) surgical operations.

The prevention of atonic constipation must be sought by inculcating regular habits, the necessity for taking food which contains a due proportion of cellulose, and the importance of daily riding or walking exercise, which is perhaps the best natural stimulant of intestinal peristalsis.

A regular habit of getting a daily movement of the bowels is one which ought to be acquired in early life and be a matter for the attention of the parents or the person who stands *in loco parentis*. At school there is the difficulty of want of time, and the closets are often so offensive as to increase the natural objection which children, especially girls, feel to the business. It is the duty of all who have authority in connection with schools to see that the sanitary arrangements are good, and that no obstacle of this kind exists in the way of proper use being made of them.

The importance of green vegetables and fruit as articles of diet is constantly overlooked, so that they form no regular part of the dietaries of children at school or of the inmates of many institutions, while they are regarded as superfluous by a large part of the people who, from motives of economy of money and time, as well as from not understanding their importance, do not give themselves the trouble to provide or to eat them if provided by others, as may be seen, for example, among domestic servants.

The importance of daily exercise is more generally admitted, and happily with a large part of our population a sufficient amount of walking is still inevitable, but owing to the facilities accorded by the rapid development of all forms of mechanical locomotion there is much risk that the daily walk to and from work, which is for most persons the only exercise they obtain, will become less a matter of necessity and be abandoned in order to save time. We should, as a profession, do our best to oppose this tendency of the times and impress upon our patients that without a certain amount of exercise the bodily functions must become deranged and health impaired. We see the evil effect in the case of those persons who are not obliged to work and who are indisposed to active out-door amusements; this applies to a considerable proportion of women in easy circumstances,

though probably to a less extent than it did a generation or two ago. No doubt many of the younger women in these classes take active exercise, but as they get older they fall into sedentary habits.

The special diet to be used by persons with a tendency to constipation should include either porridge or brown bread, and uncooked fruit or uncooked vegetables, such as salads and cresses, with each meal; where these articles of food cause indigestion it may be impossible to persist in their use, but we must substitute well-cooked green vegetables, stewed pears and apples, or figs, and other dried fruits, which can be obtained at all times of the year.

It is also probable that many constipated persons drink too little water, and it may be necessary to prescribe a certain amount of water to be drunk in the course of the day, but it should not be hard water. Constipated persons should not drink milk with their meals, China tea may, with advantage, replace the more astringent varieties from India and Ceylon, and white wines (Moselle or Graves) be preferred to red.

The places at which mineral-water cures for the treatment of constipation may be obtained are innumerable, but under the influence of fashion, only a few are at the present time frequented. Of these, unquestionably Marienbad stands first. Like Franzensbad and Carlsbad, it is in Bohemia, and the long journey and the expense of the cure place it beyond the reach of many patients. Its waters belong to the group of sulphated alkaline waters, and contain sulphate, chloride, and bicarbonate of soda, with free carbonic acid gas. Carlsbad and Franzensbad, its neighbours, present no particular advantages, as they are as far from England and nearly as expensive. Of the group of mineral water stations near Frankfort, Homburg is undoubtedly the most popular. There are several springs at Homburg,

of which those used for intestinal troubles contain chiefly sodium chloride, with chlorides and carbonates of the alkalies and alkaline earths. These waters do not contain salts which are generally regarded as purgative, but, in the quantities given, their action is effective. Homburg is within an easy distance of England, and is less expensive than its Bohemian rivals. Kissingen is not fashionable with English people, but its waters are undoubtedly suitable for the treatment of constipation; they contain chiefly chlorides of the alkalies with carbonic acid gas. It is in Bavaria and is not so accessible as Homburg nor so distant as Marienbad; German cooking and times as to meals prevail there.

The waters of Harrogate are beneficial in chronic constipation, but the type of person which derives most benefit from them is the obese, full-blooded, gouty patient of middle or past middle age, and they are not suited to delicate or nervous patients. The waters contain chiefly common salt, with a little sulphate of soda and a large amount of sulphuretted hydrogen.

Cheltenham waters are highly suitable for the treatment of constipation, as many of the springs contain sulphate of magnesia, sulphate of soda, and common salt; in some respects they compare favourably with the foreign waters which have been mentioned, but the wave of fashion has receded temporarily from the Gloucestershire spa.

Although nothing is really equal to the natural exercises of riding or walking, yet, where from age or obesity these become difficult or there is want of will to persist, they may be in part replaced by passive exercises. Abdominal massage, alone or combined with electricity, either by making the hand an electrode, or by giving a short faradic sitting after or before the massage, or the mechanical kneading of the abdomen performed by a machine in a

Zander institute, such as may be found at most of the foreign spas, helps to stimulate peristalsis. Electricity may also be applied by a large flat electrode over the abdomen, through which a slowly interrupted galvanic current of from 5 to 10 milliamperes may be passed for ten or fifteen minutes.

Some patients find benefit from the application of a wet abdominal compress worn for some hours.

The drugs which have been, and are, used for the treatment of constipation are so numerous that it is impossible to name all of them; it will be sufficient to mention those which are most used.

It is desirable that an aperient should be one which can be taken for a long period without doing harm, and therefore I do not include under this head such drugs as the preparations of mercury, which, although very effective for clearing the bowel, are obviously not suited for daily use.

It is also important that the aperient used should be one which can be easily regulated, mild in its action, and equal in its effects, so that a given dose may be generally relied upon to produce only a known effect. On the whole, mineral waters, or the salts which constitute the purgative bases of these waters, best fulfil these requirements, but many delicate invalids, especially neurasthenic persons, find saline aperients depress them. Of all saline aperients the sulphate of soda is the most pleasant, and is as trustworthy as its less palatable rival, sulphate of magnesia. Plain sulphate of soda may be given, dissolved in a small quantity of hot or cold water, with directions to sip it slowly either before getting out of bed or directly after rising in the morning. A pleasant modification is to use the effervescing form of the powder, but it should be sipped slowly, in the same way as the plain salt. The principal mineral waters containing sulphate of soda are Carlsbad,

Rubinat, and Condal. The quantity of sulphate of soda or sulphate of soda water to be taken must be regulated by the requirements of each case; about a teaspoonful of sulphate of soda or a wineglassful of the mineral water is usually the best dose to begin with.

Phosphate of soda is a mildly aperient salt which is also sold in an effervescing form; the dose and method of administration are the same.

Sulphate of magnesia, from its bitter taste, is not so popular, but is a very effective aperient, and can also be obtained as an effervescing powder.

Seidlitz powders are still liked by many patients, although their action is rather uncertain and apt to cause sharp purging. This is probably due to the addition of sulphate of magnesia, which is often done to heighten their effect. The proper Seidlitz powder should contain only sodium potassium tartrate (Rochelle salt) and sodium bicarbonate, with tartaric acid.

The vegetable aperients most in favour are the various preparations of senna, cascara, and aloes.

Senna is the mildest and, perhaps for that reason, the most popular of these drugs, but, not altogether with justice, has acquired a reputation for causing griping, which seems only to occur when it is used in large doses; it forms the principal ingredient in the compound liquorice powder (*Pulvis glycyrrhizæ compositus*) and the official confection and syrup. The official preparations are all made from the leaves, but the legumes or pods also contain a purgative principle, and are somewhat extensively used at the present time. Many patients find that a cold infusion of from 8 to 10 of the pods in 3 or 4 ozs. of water, taken every night at bed time, is a very efficient remedy, or a few of the pods may be stewed with prunes and then picked out, the prunes and accompanying syrup forming

an agreeable mild aperient. The well-known syrup of figs is said to owe its efficacy to a watery extract of these pods.

The various preparations of cascara sagrada act more powerfully. The liquid extract has a strong bitter taste, which is covered with difficulty by syrup and aromatic drugs. It is therefore preferable to prescribe this drug in capsules or pills. The dose of dry extract is from 2 to 8 grains, and it may be given every night at bed time, or, in obstinate cases, three times a day before meals.

Aloes, in its various preparations, especially aloin, is a favourite remedy with many practitioners, and forms, as is well known, the active principle of a large number of pills in combination with nux vomica or strychnine and belladonna. The dose and modes of administration are so well known that they need not detain us.

Phenolphthalein (Purgen) is a comparatively recent addition to our stock of aperients, and has had the advantage of a good deal of advertisement; it is regarded by some practitioners as an excellent remedy, but is still on its trial; the dose is from $\frac{1}{2}$ to 10 grains.

Sulphur is an excellent laxative, its action being mild and certain, but it possesses the disadvantage of causing offensive stools. It is contained in the compound liquorice powder to which reference has been made. It is often given in the form of the official confection (*Confectio sulphuris*), either alone or with an equal quantity of the confection of senna, or in the form of compound confection (No. 19). The tablets of guaiacum and sulphur, recommended some years ago by Sir Alfred Garrod, are frequently employed on account of their slight laxative action. A similar combination exists in the well-known Jephson's powder (No. 18), which is composed of two parts of precipitated sulphur and one part of powdered guaiacum, of which the usual dose is a teaspoonful; it is a rather

powerful laxative, although harmless, and is easily taken suspended in milk.

Castor oil is well known for its mild and certain effects, but its nauseous taste is an objection to its frequent use, although nothing is better when it is desirable to get the bowels to act after they have been confined for some days; under these circumstances, a dose of ½ or 1 oz. is required. Small doses may be given in capsules, and, in the constipation of old people, it acts very well in doses of ½ to 1 drm. A better way of giving it is with an equal quantity of glycerine, taken either at bed time or the first thing in the morning, and this mixture is not unpleasant to take, but can be ordered in capsules if preferred.

Enemata have never become such popular remedies for habitual constipation in this country as on the Continent, a belief being generally entertained that they ultimately weaken the action of the bowel. Their utility is fully recognised by the profession as a means of emptying the lower bowel in all cases where we are in doubt as to the diagnosis or suspect the presence of local ulceration, and therefore desire to unload the bowel in the gentlest manner, or where there is an accumulation of hardened fæces which cannot be expelled. Enemata should always be employed in the constipation of typhoid fever or whenever the patient is very weak, as their action is mild and confined to the lower bowel. Larger enemata can be given, and not uncommonly copious irrigations are used in the hope of filling the whole of the colon with fluid and so modifying its contents. These may cause considerable pain and should, therefore, be given slowly, the quantity being regulated by the feelings of the patient. The use of a long tube which is passed up the bowel beyond the region that can be explored with the finger is not recommended. If employed the tube should be of soft rubber like a stomach-tube, but

of somewhat greater diameter, and it should be introduced without the use of any force; it should never be used where there is reason to think there may be ulceration of the bowel; the method is one which always has in it some elements of danger and is rarely, if ever, necessary. An enema should consist of from ½ to 1½ pints of fluid; this may be plain soap-suds or thin gruel, and to either of these bases may be added 1 oz. of castor oil or glycerine, or 1 oz. of castor oil with ½ oz. of turpentine. The temperature of the enema should be about that of the body. Large enemata of olive oil (½ pint) are sometimes used for softening hard masses of fæces.

Rectal injections of glycerine by means of a vulcanite syringe, the quantity used being about ½ oz., are a popular and effective means of producing an action of the bowels.

The use of all means that involve the introduction of a syringe are inapplicable in cases where there is a tendency to piles, and after they have been employed for a few days the local disturbance may cause so much soreness that in spite of gentleness and care, other methods of acting on the bowel have to be employed, but this rarely happens where the enema is only used once every two or three days and is not continued for more than a few weeks.

In the treatment of **spasmodic** constipation it is necessary to avoid those articles of food previously recommended as stimulating peristalsis on account of their containing a certain proportion of indigestible cellulose in the shape of fibres, seeds, and membrane. We must forbid the use of porridge and brown bread, uncooked fruit and raw vegetables, such as salads and cresses, and order even cooked fruit, if it contain seeds and skins, to be passed through a hair sieve. As these cases are invarably associated with neurasthenia the general hygiene and mode of life should be so regulated as to improve the general health. This is

undoubtedly best effected by change of scene with residence in a bracing place, but if the case is too far advanced to benefit by these means a complete rest cure of at least three months' duration should be carried out. During this period general massage of the limbs and trunk is desirable, but abdominal massage often does more harm than good, and if permitted at all must be of the very gentlest kind. Gentle rubbing with the hand over the abdomen sometimes seems to relieve pain, but it must be cautiously carried out. In the same way electricity, if employed at all, must only be used in the shape of a weak galvanic current applied by means of a flat electrode large enough to cover the whole abdomen. Abdominal compresses and fomentations often give relief, and their use may be combined with the rest cure.

The drugs to be tried are belladonna in the form of tincture, 5 to 10 minims, two or three times a day, or of extract in pills $\frac{1}{3}$ to $\frac{1}{2}$ grain before each meal, and may be combined with menthol, $\frac{1}{2}$ to 1 grain for each dose (No. 20).

Olive oil may be given by the mouth, plain or as olive oil mixture (No. 11), in keratin coated capsules containing $\frac{1}{2}$ or 1 drm., in doses from a teaspoonful to a tablespoonful half an hour before meals. Castor oil alone or combined with glycerine may be given by the mouth or glycerine enemata by the bowel.

Large warm olive oil ($\frac{1}{2}$ pint) enemata at 90° to 95° F. are very soothing to the bowel as well as effectual in overcoming this form of constipation.

Nervous Diarrhœa.—From time to time we meet with patients of either sex, generally under middle age, who complain of diarrhœa which comes on at the most inconvenient times. For example, they find themselves unable to go to church or into society, and dread being shut up in a railway carriage for any length of time, as they know

they will be troubled by an imperious desire to go to stool. Often associated with the nervousness of youth it tends to improve or disappears entirely in course of time. As it is a pure neurosis the treatment should be directed to improve the general health by prescribing rest, change of scene, or under suitable conditions a Weir-Mitchell course. Simple astringent remedies are useless, but opium, or its alkaloids (No. 8), administered cautiously are of service, because they not only diminish the intestinal peristalsis, but act as sedatives to the general nervous system. Unhappily even in small doses they disagree with many persons. The bromides (No. 2) are not open to this objection, but are less effective, they are, however, worth trying. The dose should be taken before the visit or railway journey during which it is desired to keep things quiet.

(*c*) Parasites.

The principal parasites of the intestine which need mention here are—(1) *Ankylostoma duodenale* or miner's worm, (2) the various forms of tape worm, (3) round worms, and (4) thread worms; as these are all which give rise to symptoms of importance.

The **Ankylostoma** is met with in many parts of the world, and has, unfortunately, been introduced lately into England by the return of miners from South Africa. It is believed that infection takes place by drinking polluted water or eating food contaminated with soil containing the embryos, but it is also maintained by some (Loos) that infection may take place through the skin. It is said that many persons in good health are hosts of this parasite, and it is probable that symptoms are produced only when the worms are present in very large numbers. These symptoms are gastro-intestinal disturbance, progressive loss of weight,

and severe anæmia, leading to wasting, weakness, and dropsy. The diagnosis depends upon the detection of the eggs in the stools and the exclusion of other possible causes of anæmia. In order to prevent the disease, care should be taken to exclude from mines persons already infected, the latrines should be regularly disinfected with chloride of lime, and the mines sprayed with solution of common salt. The medicinal treatment is by giving a dose of castor oil, followed by 30 to 60 grains of thymol carbonate in cachets, capsules, or emulsion (No. 15), and this to be followed by another dose of castor oil in the evening; the patient meanwhile to take no food. Another plan is to give four successive hourly doses of 30 grains of thymol.

The popular impression that the presence of a **tape worm** leads to impairment of nutrition is, of course, false, and it is doubtful whether these parasites usually cause any symptoms apart from the irritation due to the escape of the joints, but there are certain recorded cases of the cessation of various ailments after the expulsion of the worm. The diagnosis can be made only by detecting the joints in the dejecta of the patient. The treatment of tape worm is often unsuccessful because it is not carried out with sufficient care. It is advisable to recommend the patient to stay in his bedroom while under treatment, and to begin this by taking no food after mid-day, except milk and soda water, to be followed by a dose of an aperient, such as 10 grains of scammony resin, at bed time. In the morning a drachm of the extract of *filix mas* may be given in emulsion (No. 13), or in milk, or in capsules which contain 15 minims each. During that day no food should be taken but milk and soda water, and at night another dose of scammony resin. The stools should be passed into muslin and carefully washed under a tap so as to ascertain whether the head of the worm has come away; it may be

lost in spite of this precaution, but if, after three months, no more joints are seen, a cure may be certified. The most important point in the treatment is that no other food but milk should be taken for some hours before and after the fern oil, and it is in order to avoid the temptation of companions that it is advisable to confine the patient to his room. The prophylaxis of tape worm depends upon the careful inspection of the meat supply.

Round worms are probably introduced into the body by polluted drinking water, and are rarely met with among the inhabitants of towns which have a good water supply. In children, they frequently cause gastro-intestinal disturbance, abdominal pains, and convulsions; they have also, from time to time, set up various troubles—such as for example, jaundice, by entering the common duct. The best treatment is santonin (2 to 5 grains), which should be always given combined with an aperient—*e.g.*, scammony (5 to 10 grains). It may colour the urine yellow, but does not give rise to poisonous symptoms when so combined. Turpentine and castor oil, 2 drms. to ½ oz. of each, form an excellent vermifuge, but the dose is somewhat nauseous.

Thread worms are rarely seen in adults, but are common enough in children. It is supposed that the eggs are swallowed with polluted water or food. The principal symptoms are itching and irritation about the nose and anus, giving rise to scratching. Sleep is often disturbed, and there may be grinding of the teeth. They often cause incontinence of urine and diarrhœa. The diagnosis must depend upon the detection of the worms in the dejecta. It is believed that the parent worms live high up in the colon or in the cæcum, and that the broods of young worms which are formed from time to time only give rise to symptoms when they reach the rectum. Treatment, to be successful, must be continued for some time; it is not

sufficient to give an enema and clear out the rectum, when the parent worms probably lie higher up out of its reach. After clearing out the lower bowel, it is necessary to give an irrigation or infusion of quassia or salt solution (7 per mille) so as to flood the entire colon, and this should be repeated every day for a week or a fortnight. The itching may be relieved by the use of phenol or menthol ointment. As a rule, these worms are easily got rid of, but, from time to time, cases are met with where, acquired in childhood, they remain to trouble the patient long after adult life has been reached. In these cases the persistent administration of the aperient iron mixture (No. 7) for many months is worth a trial.

V. DISEASES OF THE RECTUM.

(1) **Rectal Catarrh.**—Catarrh of the rectum is rarely seen as a primary condition, although it may occur as a result of exposure to cold and wet, but most often it is secondary to constipation, the abuse of enemata, the irritation of thread worms, or the presence of cancer, ulceration, or simple stricture.

The symptoms are a discharge of mucus with tenesmus, and, when persistent, it often leads to eczema around the anus.

The diagnosis may be made by the presence of these symptoms, but the condition can be verified by rectoscopic examination.

The treatment of the more acute forms is by rest, simple diet, hot sitz-baths, or hot compresses with local sedatives, such as opium and belladonna suppositories (No. 21).

In the more chronic cases, which are generally secondary, the cause should be removed (if this is possible), and then the rectum may be irrigated twice a day with a warm ½ per cent. solution of nitrate of silver. This should be introduced by a soft tube, and retained for some minutes.

(2) **Ulceration.**—Ulceration may occur from a variety of conditions, the symptoms being the discharge of blood, pus, and mucus, with tenesmus, and frequent desire to go to stool. The existence of the ulceration may be made certain by a rectoscopic examination. The local treatment is the use of the sitz-bath, with injections of ½ per cent. solution of nitrate of silver, or direct application to the ulcerated surface by means of a tampon of a 10 per cent. solution of chloride of zinc.

(3) **Cancer** gives rise to symptoms very similar to those described under the preceding headings. There is frequent desire to go to stool, with diarrhœa, and sometimes the discharge of merely blood-stained mucus. The diagnosis can only be made by digital or rectoscopic examination.

The treatment must be palliative. Pain may be relieved by rest, the use of non-irritating food, and the administration of a mild laxative, such as castor oil. A suppository of opium and belladonna (No. 21) may be used to relieve pain.

Should obstruction occur, surgical assistance must be obtained, and a colotomy performed; the result of this operation is frequently to give great relief, and to prolong life for many months.

(4) **Simple stricture** may be the consequence of the cicatrisation of dysenteric or syphilitic ulceration.

The bowels must be kept loose by the use of laxatives, of which castor oil is perhaps the best, and, if within reach, the stricture may be dilated by bougies, and the effect of the hypodermic injection of thiosinamine (No. 22, see p. 46) should be tried. If there is danger of obstruction colotomy must be performed.

(5) **Fissure.**—A fissure of the anus is probably produced by tearing the mucous membrane through straining at stool, so that constipation is the real cause.

The symptoms are pain on defæcation, felt locally and also radiating around the pelvis, with spasm of the sphincter, which lasts for some time. There may be also a slight discharge of blood and pus. The symptoms are characteristic, but the diagnosis can only be made by careful inspection. The fissure, which is often deep and hidden by the folds, may only be seen by examination in the knee-elbow position.

The proper treatment is undoubtedly surgical, by

stretching the sphincter or by incision, but we may try for a time the effect of keeping the bowels easily open with castor oil, and the local application of ichthyol twice a day, or of 10 per cent. solution of cocaine, followed by touching with solid nitrate of silver.

(6) **Polypi.**—Polypoid growths of the mucous membrane may occur as a consequence of chronic catarrh. They give rise to bleeding, and can be recognised by digital examination. Their treatment can only be surgical.

(7) **Piles and Prolapse.**—These conditions are placed together, because they are commonly confounded by the public. If a local examination is made it will be found often that the so-called piles are merely prolapse. Such a prolapse may become chronic, leaving a permanent collar external to the ring of the sphincter. This fold is liable to become inflamed from time to time, and when seen may be irreducible. The immediate cause of the prolapse may be diarrhœa, but, like piles, the relaxed condition of the mucous membrane which makes it possible is no doubt the consequence of chronic constipation.

The treatment must be the prevention of constipation by the daily use of an aperient, for which purpose various mineral waters are extremely useful, one of the best being Rubinat water, of which a wineglassful should be taken every morning on rising, or we may give the aperient iron mixture (No. 7). An excellent local application is calomel ointment stiffened with cocoa butter (No. 23).

The directions to be given to the patient should be to bathe the anus with cold water night and morning after the bowels have acted, and to dry the parts with a soft towel, then to introduce a piece of the ointment about the size of a hazelnut into the bowel. In the case of bleeding piles we may try the addition to this ointment of 1 drm. of hazeline or tincture of hamamelis, or ½ drm. of the solution

of adrenalin chloride; but although many slight cases of piles may be treated successfully by such means, when there is marked structural change, and these means do not give relief, it is better to call in a surgeon.

Nervous.—Nervous affections of the rectum are rare, but there are anal crises sometimes met with in *Tabes dorsalis* in which there is marked spasm and tenesmus, which can only be relieved by opium or morphia. In some cases of hysteria, too, there may be severe spasm of the sphincter.

VI. SYMPTOMATIC DISEASES DEPENDING UPON AFFECTIONS OF THE GASTRO-INTESTINAL SYSTEM.

There is no knowledge of greater value to the practitioner than that which enables him to trace correctly various symptoms to their causes, as such knowledge frequently places in his hands the means of effecting a cure. There are many symptomatic diseases which depend upon stomach derangements, but perhaps it may be said that this knowledge is commonplace, and that the relation has been exaggerated, or that the more accurate knowledge of the past few years has tended to diminish the *rôle* of the stomach and intestine in the causation of these symptoms, as a better knowledge has been acquired of the functions of other organs. There may be some truth in this criticism, but in what I propose to say I believe it will be found that, after taking into account the results of recent research, much that is of importance is left which every practitioner should know.

Nervous System.—Headaches are often associated with gastro-intestinal disturbance, but they are more frequently caused by the absorption of poisons taken as food than by deranged digestion; although anything that favours absorption of poison, such as constipation, may stand in a causal relation to them, or, in other words, the headaches may be relieved or prevented by emptying the bowel. It is true that headaches are frequently due to the absorption of excessive quantities of the products of digestion, and that, when so caused, they can be most certainly cured by reducing the total quantity of food, and by abstaining from alcohol, tea, and tobacco. Vertigo is commonly associated

with gastritis in its various stages, and appears to depend directly upon the irritated or inflamed state of the stomach. The same relation seems to obtain for fidgets and for cramps in the calves of the legs, as well as for the condition described by Weir Mitchell under the name of nocturnal hemiplegia; the last is so little known as to deserve a few lines of description. The patient, who is most often a woman, complains of losing the use of a limb, usually the arm or leg on the same side, but sometimes both legs, or even all four extremities. She wakes in the night, conscious of the inability to move the affected limb, and is naturally much alarmed, if it is the first attack. The limbs affected are generally upon the side upon which the patient has been lying, which has led to the condition being considered by some as identical with pressure paralysis; but the patient has not always been lying on the affected side, and there is no direct pressure upon any nerve trunk. Considerable pain or tingling may be associated with the loss of power, but the condition soon passes off, recovery being hastened by friction. These cases have generally, but not always, other symptoms of gastritis, such as furred tongue, constipation, and discomfort after food; they recover readily after a course of treatment such as has been described for sub-acute gastritis (*vide* p. 53).

Epilepsy, like headache, may depend upon the toxic effect of substances taken as food, but it is not intended to imply that all, or even most, cases of what is called "idiopathic epilepsy" can be shown to bear any relation to food poisons.

On the other hand, tetany in its most severe type is met with in patients with dilated stomachs, and is probably due to the absorption of poisons formed in the stagnant stomach contents, while the milder variety seen in infants ends evidently upon gastro-intestinal trouble, as it yields

readily to simplification of diet and the administration of calomel.

Insomnia is, in many cases, caused by stomach trouble, even although some patients do not suffer from any symptoms pointing to that organ. In the most common form the patient soon gets to sleep, but wakes up in two or three hours feeling hot and restless, but only in a minority of cases is there any heartburn, or sour rising, or pain; he is uneasy in any position, and turns from side to side until, after a longer or shorter interval, sleep returns. In the morning he may feel perfectly well, or may complain of a bad taste in the mouth, and say he is not refreshed by the night's rest; there may be sometimes giddiness which soon passes off, especially after food or even a cup of tea has been taken. In other cases the patient wakes at the crisis of a dream, a "nightmare," which seems to be the result of an attack of stomach vertigo occurring during sleep. The night alarms of children are also frequently the consequence of digestive troubles.

In all these cases it is necessary to examine the state of the digestive organs, to regulate the diet, to fix the time of the last meal, which should be simple, small in quantity, and easily digestible, at least three hours before going to bed, and to make certain that the bowels act sufficiently every day. As a rule, we should avoid giving any regular hypnotic drug, but an alkaline draught (No. 5) may be prescribed to be taken the last thing at night.

Several observers have recorded cases of coma of the type first described by Kuessmaul as occurring in diabetes, which is now frequently spoken of as diabetic coma. The attack commences with rapid pulse and epigastric pain, followed by deep, quick-sighing breathing; the urine gives the Burgundy-red reaction with solution of perchloride of iron, while acetone and albumen are often present. After

a few hours the patient becomes drowsy and sinks into a deep sleep from which at first he can be aroused with difficulty, but ultimately the coma becomes absolute, and is only terminated by death, which has in a few cases been preceded by a convulsion. Most of the gastric cases have occurred in association with cancer of the stomach, but in one described by Litten, in a boy recovering from scarlatina with albuminuria, there were what the reporter calls "dyspeptic conditions."

The pathology of this form of coma is generally believed to be poisoning from the presence of excess of beta-oxybutyric acid, which may break up to form diacetic acid, acetone, and carbonic acid. It is diacetic acid which gives the ferric chloride reaction above referred to. Although this condition is generally fatal it is noteworthy that Litten's case was an exception, as it recovered. It is therefore probable that the gravity of the condition depends largely upon the state of the patient when the toxæmia supervenes. The duration of the coma from the first indication until death varies from eight to forty-eight hours.

The treatment which is most likely to prove effectual is the early evacuation of the bowels by a brisk purgative, followed by the injection of large enemata of bicarbonate of soda (½ oz. to a pint of water). Alkalies may also be given by the mouth, and Reynolds strongly recommends the administration of 30 to 60 grains of citrate of potash every hour, in copious draughts of water. Intravenous injections of normal salt solution have, in my experience, been followed by slight temporary benefit, but the only case that I have seen to recover was treated by enemata of bicarbonate of soda. Hypodermic injections of strychnine may be used to maintain the heart's action, but if any good is to result the drug should be pushed; 5 minims may be given every hour where the heart shows signs of failure.

Disturbances of vision are frequently seen in consequence of digestive disorders, of which, perhaps, the most common is the appearance of black spots before the eyes, so-called *Muscæ volitantes*, which are generally recognised by the laity as the result of what they call biliousness. Another common condition not so readily recognised as depending upon stomach derangement is pain in and around the eye with photophobia, due to asthenopia or functional weakness of the muscle of accommodation. In this condition, if the patients read, or write, or sew by artificial light, they find that vision is difficult, and is followed by pain and tension of the eyeball, and in the evening there will be some redness of the conjunctivæ and of the margins of the lids.

Less commonly one sees scotomata and hemianopsia, in which there are blind areas in the retina, which in the latter form extend to exactly one-half of the field of vision.

In ophthalmic migraine there may be not only severe pain at the back of the eye, with luminous spectra and other disorders of vision, but there may also be actual oculo-motor paralysis of the third nerve, giving rise to ptosis, dilatation of the pupil, and external strabismus. This alarming group of symptoms may recur from time to time, and may even be accompanied by slight loss of power in the arm and leg of the same side, or even, if affecting the right eye, by temporary disorder of speech.

Affections of the ear have been frequently noted in connection with diseases of the stomach. The commonest complaint is of subjective noises, either singing or buzzing, but deafness is also a common complaint. These depend for the most part upon blocking of the Eustachian tube from pharyngeal catarrh, which so frequently accompanies catarrh of the stomach; it has been suggested that the stomach may affect the ear reflexly through the pneumo-

gastric nerve, so that it is possible that some of the causes of subjective noise may originate in this way.

Respiratory System.—Laryngismus stridulus may be due to stomach or intestinal irritation, such as is caused by the presence of round or thread worms, and asthma may be induced by the presence of undigested food in the stomach, and is often readily relieved by the administration of an emetic. Many cases of bronchitis are associated with catarrh of the gastric mucous membrane, and yield to remedies directed to the latter disease when they would obstinately persist under the use of cough mixtures.

Cough is often purely of stomach origin, even when accompanied by a good deal of expectoration, yet if this is examined in a sputum cup it will be found to consist of watery mucus, with very little froth and no muco-pus; such sputum is characteristic of stomach cough.

Circulatory System.—Pain at the heart and so-called false angina are often associated with gastritis, so also may be an irregular or intermittent pulse. Acute stomach derangement may lead to nausea and syncope, flatulent distension of the stomach may interfere with the action of the heart, and death has been attributed to this cause in old persons, where the ventricular wall is thin and degenerated.

In simple anæmia there is frequently constipation, and the late Sir Andrew Clark considered that poisonous substances absorbed from the bowel play the chief part in the production of chlorosis; whether this be true or not, there is no doubt that it is most desirable to combine the use of an aperient with the administration of iron. In pernicious anæmia there is frequently atrophy of the glands of the stomach, and this lesion was held by the late Dr. Samuel Fenwick to be the cause of the anæmia, but Dr. Knud Faber's investigations have proved that it is always

secondary, and should be regarded as the consequence, and not as the cause, of the disease of the blood.

The Liver.—The intimate connection between the liver and the stomach are, perhaps, almost too well known, so that in popular pathology the liver takes the first place, although in reality its affections are nearly always secondary. The functions of the liver are greatly under the control of the stomach, and depend upon the processes which go forward in the latter organ. That is to say, the secretion of gastric juice is followed by the secretion of bile, and where the gastric secretion fails the secretion of the liver diminishes also. Where the stomach is stimulated by the excessive use of rich food and alcohol to over-action, the liver also becomes congested, and we see chronic gastritis followed by chronic hepatitis attributable to the same causes.

But this liability to suffer from similar causes depends not only upon functional relation, but also upon structural connections, for there can be no doubt that in certain cases catarrhal inflammation of the gastric mucous membrane spreads into the duodenum, and causes retention of bile by giving rise to swelling of the mucous membrane at the ampulla of Vater, with perhaps slight extension of the inflammatory process into the opening of the common duct. Moreover, under the influence of poisons derived from the ingesta, the resistance of the liver to micro-organisms is diminished, and the ordinarily harmless *Bacillus coli* may invade the bile ducts, become virulent, and set up purulent cholangitis, or more rarely determine acute inflammation of the parenchyma of the liver, as in acute yellow atrophy.

It is also probable that the glycosuria met with in dyspepsia is the result of the over-stimulation of the liver by alcohol or other excitants, which act first upon

the stomach. The accuracy of this view of these conditions is shown by the good results that follow treatment based upon these principles.

Urinary System.—It is well known that many of the derangements of the urine depend upon disordered digestion. Although the deposit of urates is primarily due to the concentration of the urine, yet it is often seen in sub-acute gastritis even where there is no diarrhœa; crystals of uric acid separate when the urine is highly acid, as it may be after drinking beer or acid wines, or eating excessive quantities of meat.

Phosphaturia in the form of alkaline amorphous phosphates is constantly associated with chronic dyspepsia of the type in which there is excessive secretion of gastric juice; the other form of phosphaturia, in which stellar crystals of acid phosphates are deposited, occurs frequently in large eaters who are fat, and take little exercise and use excessive quantities of sugar.

Oxaluria may depend upon the ingestion of certain articles of food containing oxalic acid, such as garden rhubarb, but in most cases this explanation is absent; it is not uncommonly associated with dyspeptic troubles, pointing to atony and including constipation; expert opinion now inclines to the view that oxalic acid is a product of altered food metabolism, so that dietetic restrictions should be directed to the exclusion of lime, which is the only base with which oxalic acid forms insoluble compounds, for this reason milk should be forbidden to persons suffering from this condition.

Glycosuria often occurs in connection with dyspeptic troubles. This may be in part explained by the influence of alcohol, but not always, as in certain cases I have been able to exclude this definitely. These patients have presented the general signs of gastritis, and under appropriate

treatment the sugar has disappeared, together with the stomach affection. The amount of sugar in some cases has been as much as 5 per cent., and yet I have satisfied myself of its transient character by inquiries made after the lapse of some years; thus a case seen in 1895 was perfectly well in 1900.

The relation of albuminuria to the ingestion of certain articles of food was known to the earlier writers upon the subject, although such cases are rare. Most will remember the case recorded by Christison of the young man whose urine always contained albumen after eating cheese, and the classical experiments of Brown-Séquard, Barreswil, and others prove that the urine may become albuminous on a diet largely composed of eggs. Albuminuria occurs in those who eat excessive quantities of meat, but this may be without any actual digestive derangement, such as that described as causing glycosuria. It may, however, be frequently observed in feeble persons with atonic dyspepsia, without there being any other evidence of organic disease of the kidney. Peptonuria is said to occur in dilatation of the stomach (Bouchard) but has no known pathological significance.

Indican is a product of pancreatic digestion, but its presence in the urine is generally admitted to be an indication of intestinal disorder, especially of some condition which may cause stagnation of its contents.

Lastly, polyuria may sometimes result from intestinal disturbance, such as the presence of a tape-worm.

Integumentary System.—Flushing of the face is a common result of disordered or difficult digestion, while burning of the hands and feet and sweating of the palms of the hands and soles of the feet are seen in connection with taking certain food, and especially after tea or coffee. Paroxysmal sweating may occur in connection with chronic

gastritis, especially where this condition is induced by the abuse of alcohol. Some years ago I recorded three cases of this not very common condition, all occurring in men of middle age who were in the habit of drinking freely. The attacks of sweating generally happened in the night; one patient said that they came on early in the morning, when he awoke feeling hot and ill, as if he were going to die; his hands felt swollen, and his face was very pale. The secretion of sweat began in the right temple, and then broke out all over his body; it lasted three or four hours. Exceptionally, the attacks came on in the day after food. The paroxysm was attended by the passage of a large quantity of limpid urine. He stated that he had first suffered in this way twelve or fourteen years previously, when he attributed it to excessive drinking, and he had since found that drinking whisky would always bring it on. According to this patient and another, the paroxysms seemed to diminish or stop on getting out of bed. One case was cured by small morning doses of the sulphates of soda and magnesia, with 1 minim of solution of atropin, taken in hot water. Another case yielded to compound ipecacuanha powder, and a third was successfully treated by a sixtieth of a grain of atropin, given with hydrochloric acid and strychnine, three times a day after food, the bowels being at the same time kept freely open by the daily use of a saline aperient.

The relation of many skin diseases to gastro-intestinal derangements is well known, especially the erythemata, notably common urticaria, and the simple red rashes seen after eating particular articles of food or the use of a simple enema, up to such rare forms as *Herpes iris*. A most severe case of recurrent *Herpes iris* occurred in a man whose attacks were induced by beer-drinking; in another patient the eruption coincided with an attack of diarrhœa,

and disappeared with it. *Eczema capitis* in infants is nearly always associated with gastro-intestinal derangement, and is practically never seen in children who are fed entirely upon their mothers' milk. Eruptions of acne, especially *Acne rosacea*, are often associated with digestive disorders, although these are by no means the sole causes.

In the causation of prurigo—that is to say, all those affections of the skin in which the initial symptom is itching, and where the anatomical changes, which may assume the form of lichen or eczema, are secondary, and are caused by scratching—stomach affections hold an important place, and treatment based upon the recognition of this relation is most likely to be successful.

LIST OF FORMULÆ.

No. 1.—Soda and Gentian Mixture.

℞.—Sodii Bicarb.,	gr. x.
Tr. Rhei,	℥ xv.
Tr. Zinziberis Fort.,	℥ v.
Inf. Gent. Co. ad.	1 oz.

No. 2.—Bromide Mixture.

℞.—Pot. Bromidi.	
Sodii Bromidi, āā,	gr. x.
Aq. Camphoræ,	1 oz.

No. 3.—Bromide and Valerian Mixture.

℞.—Potassii Bromidi,	gr. x.
Tr. Valerianæ Ammon.,	℥ xxx.
Aq. Camph. ad.	1 oz.

No. 4.—Rhubarb and Bismuth Mixture.

℞.—Sodii Bicarb.	
Bismuthi Carb., āā,	gr. x.
Pulv. Rhei,	gr. iiss.
Muc. Tragacanthi,	℥ xv.
Aq. Menthæ Pip. Destill. ad.	1 oz.

No. 5.—Antacid Mixture.

℞.—Sodii Bicarb.	
Bismuthi Carb., āā,	gr. x.
Magn. Carb.,	gr. xv.
Muc. Tragacanthi,	℥ xv.
Aq. Menthæ Pip. Destill. ad.	1 oz.

No. 6.—Acid Mixture.

℞.—Acid. Nitrohydrochl. Dil.,	♏ x.
Tr. Nucis Vom.,	♏ x.
Succi Taraxaci,	1 drm.
Aq. ad.	1 oz.

No. 7.—Aperient Iron Mixture.

℞.—Ferri Sulph.,	gr. ij.
Magn. Sulph.,	gr. xl.
Acid. Sulph. Dil.,	♏ iij.
Aq. Menthæ Pip. Dest. ad.	1 oz.

No. 8.—Bismuth and Morphia Mixture.

℞.—Liq. Morphinæ Hydrochl.,	♏ xv.
Bismuthi Carb.	
Sodii Bicarb., āā,	gr. x.
Muc. Tragacanthi,	♏ xv.
Aq. Cinnamomi ad.	1 oz.

No. 9.—Bismuth and Opium Mixture.

℞.—Bismuthi Carb.	
Sodii Bicarb., āā,	gr. x.
Tr. Opii,	♏ x.
Muc. Tragacanthi,	♏ xv.
Aq. Chloroformi ad.	1 oz.

No. 10.—Castor Oil and Opium Mixture.

℞.—Tr. Opii,	♏ x.
Olei Ricini,	½ oz.
Muc. Acaciæ,	1 drm.
Aq. Cinnamomi ad.	2 ozs.

No. 11.—Olive Oil Mixture.

℞.—Olei Olivæ,	1 drm.
Pulv. Tragacanthi Co.,	gr. xx.
q. Aurantii Floris ad.	1 oz.

No. 12.—Mercuric Iodide Mixture.

℞.—Hydrarg. Biniod., ... gr. $\frac{1}{12}$.
Pot. Iodidi, ... gr. v.
Inf. Gent. Co., ... 1 oz.

No. 13.—Male Fern Mixture.

℞.—Extr. Filicis Liq., ... 1 drm.
Pulv. Tragacanthi Co., ... gr. xxx.
Aq. Chloroformi ad. . . . . 1 oz.

No. 14.—Emetic Mixture.

℞.—Zinci Sulphatis, ... gr. xx.
Aquæ, ... 1 oz.

No. 15.—Thymol Mixture.

℞.—Thymol Carb., ... gr. xv.
Mist. Amygdalæ, ... 1 oz.

No. 16.—Carminative Drops.

℞.—Tr. Zinziberis Fort., ... 10
Ol. Cinnamomi, ... 1
Ol. Carui, ... 1
Ol. Cajaputi, ... 1
Dose two to five minims.

No. 17.—Compound Bismuth Powder.

℞.—Sodii Bicarb.
Bismuthi Carb., āā, ... gr. x.
Pulv. Rhei, ... gr. iiss.
Pulv. Cinnamomi Co., ... gr. v.

No. 18.—Compound Guaiacum Powder (Jephson's Powder).

℞.—Pulv. Guaiaci Resinæ, ... gr. xx.
Sulphuris Præcip., ... gr. xl.

No. 19.—Compound Sulphur Confection.

℞.—Sulphuris Sublim., ... gr. xxx.
Pulv. Jalapæ, ... gr. iv.
Tr. Sennæ Co., ... ℥ viij.
Ol. Menthæ Pip., ... ℥ ½.
Theriacum ad. . . . . 1 drm.

No. 20.—Menthol and Belladonna Pill.

℞.—Menthol, ... gr. iss.
Ext. Belladonnæ, ... gr. ⅙.
Ext. Gentianæ.
Muc. Acaciæ, āā, ... q. s.

No. 21.—Belladonna and Opium Suppository.

℞.—Ext. Opii, ... gr. i.
Ext. Belladonna, ... gr. ½.
Ol. Theobromatis, ... q. s.

No. 22.—Thiosinamine Injection.

℞.—Thiosinamini, ... 10
Glycerini, ... 20
Aq. Destill., ... 70

No. 23.—Calomel and Cocoa Butter Ointment.

℞.—Hydrarg. Subchlor., ... gr. xl.
Ol. Theobromatis, ... 2 drms.
Ung. Cetacei ad. . . . . 1 oz.

No. 24.—Nutrient Enema.

℞.—One egg well beaten up.
A teaspoonful of salt.
Milk (which may be peptonised) at 95° F. to 6 ozs.

INDEX.

A

Abdomen, Shape of, 4.
Absorption by stomach, 7.
Acid, Acetic, 11.
,, Butyric, 10, 11.
,, Hydrochloric, 9, 10, 12, 21.
,, Lactic, 9, 10, 11.
,, mixture, 124.
Acids, Value of, 18.
Acne rosacea, 121.
Activity of gastric juice, 11.
Acute catarrh of intestine, 78.
Adductor paralysis of vocal chords, 42.
Agoraphobia, 74.
Akoria, 73.
Albuminoids in food, 37.
Albuminuria, 119.
Albumose, Test for, 11.
Alcohol, 31.
Alkalies, Pawlow on the action of, 20.
,, Value of, 20.
Aloes, 99.
Anacidity, 69.
Anæmia, 116.
Anal crises in locomotor ataxy, 110.
Ankylostomiasis, 103.
Anorexia, 71.
Antacid mixture, 123.
Anti-fermentatives, 24.
Antiseptics, 24.
Anus, Fissure of, 108.
Aperient iron mixture, 124.
Apparatus required for chemical and microscopical examination of stomach contents, 8.
Appendicitis, 84.
Appetite, 4.
Artificial feeding of infants, 27.
Asthenopia, 115.
Asses' milk, 34.
Atonic dilatation of stomach, 7, 61, 62.
,, dyspepsia, 65.

B

Bacillus coli, 85.
Barreswil, 119.
Baths in elementary schools, 27.
Beaumont, 35, 51.
Beer, 32, 120.
Belladonna and opium suppository, 126.
Benger's food, 23.
Berberine, 23.
Biliousness, Meaning of, 2.
Bismuth and morphia mixture, 124.
,, ,, opium ,, 124.
Bitters, 23.
,, Pawlow on, 23.
Blood, Detection of, in fæces, 13.
Boas-Oppler bacillus in cancer, 10, 60.
Bouchard, 119.
Bromide and valerian mixture, 123.
Bromide mixture, 123.
Brown-Séquard, 119.
Bulimia, 72.
Burette, 8.
Burning of hands and feet, 119.
Butyric acid, 10.
Buxton, 63.

C

Calomel and cocoa butter ointment, 126.
Calorific value of foods, 39.
Cancer, Indications of, in stomach contents, 10, 60.

Cancer of bowel, 83.
,, of œsophagus, 42.
,, of rectum, 108.
,, of stomach, 59, 77.
,, ,, Surgical treatment, of, 77.
Caput medusæ, 4.
Carbohydrates, in food, 37.
Carbonic acid gas, Use of, 6.
Cardia, Cancer of, 59.
Cardiospasm, 48, 71.
Carlsbad, 54, 55, 81, 95, 97.
Carlyle's gastralgia, 69.
Carminative drops, 91, 125.
Cascara, 99.
Castor oil, 100.
,, and opium mixture, 124.
Catarrh, Acute, of the intestine, 78.
,, Chronic ,, ,, 80.
,, of the stomach, 50.
,, Rectal, 107.
Catarrhal ulceration of the intestine, 83.
Châtel Guyon, 20, 55, 81.
Cheltenham for constipation, 96.
Chemical composition of food, 37.
,, examination of stomach contents, 8.
Childhood, Hygiene of, 27.
Chittenden's experiments on diet, 39.
Chlorotic gastralgia, 70.
Cholesterin, 13.
Christison, 119.
Chronic catarrh of intestine, 80.
Clark, Sir A., 116.
Claustrophobia, 74.
Coffee, 29, 30.
Colic, 89.
Colitis, Mucous, 82.
Coma, Diabetic, 113.
Compound bismuth powder, 125.
,, guaiacum powder, 125.
,, sulphur confection, 126.
Condal water, 98.
Congo paper, 8, 10.
Constipation, 28, 91.
,, atonic, Spasmodic, 93.
,, ,, Treatment of, 93.
,, Spasmodic, 101.
,, ,, Treatment of, 101.
Constitutional diseases of stomach,
Corrosive fluids, Swallowing, 45.
Circulatory system, 116.
Crystallose, 33.

D

Dextrine, 22.
Diabetic coma, 113.
Diagnosis, 1.
,, of ankylostomiasis, 104.
,, of appendicitis, 85.
,, of atonic dyspepsia, 65.
,, of cancer of the œsophagus, 42.
,, ,, ,, stomach, 59.
,, of colic, 90.
,, of dilatation of the stomach, 62.
,, of dysentery, 84.
,, of gastralgia, 69.
,, of gastric hyperacidity, 67,
,, of gastritis, 52.
,, of intestinal catarrh, 80.
,, ,, indigestion, 89.
,, ,, obstruction, 87.
,, of neuroses, 48.
,, of nervous vomiting, 71.
,, of pylorospasm, 71.
,, of rectal catarrh, 107.
,, of round worm, 105.
,, of simple stricture, 46.
,, of stomach vertigo, 73.
,, of tape worm, 104.
,, of thread worm, 105.
,, of ulcer of the stomach, 55.
,, of ulceration of the œsophagus, 45.
Diarrhœa, Nervous, 102.
Diastase, 22.
Diet, 27, 29, 33, 35, 38, 43, 52, 57, 61, 65, 79, 81, 84, 90, 93, 95, 104, 113, 118, 119, 120, 121.
Differential diagnosis of cancer of the œsophagus, 42.
Digestibility of food, 35.
Digestive ferments, 20.
,, organs, Influence of life and diet on, 26.
Dilatations of œsophagus, 46.
,, of stomach, 61, 64, 76.
Dimethyl-amido-azo-benzol, 9, 12.
Diphtheritic ulceration of intestine, 83.
Diseases of the intestine, 78, 89.

Diseases of the œsophagus, 42.
,, ,, stomach, 50, 65, 67.
Disinfectants, 24.
Distension of stomach by CO_2, 6.
Diverticula of œsophagus, 47.
Douche, Intragastric, 16.
Dry mouth, 21.
Dulcin, 33.
Duodenum, Ulcer of, 56, 59.

E

Ear, Affections of, in relation to digestive disorders, 115.
Eczema capitis, 121.
Education, 27.
Effervescing drinks, 32.
Electrical treatment of intestine, 102.
,, ,, of stomach diseases, 18, 63.
Electricity, 17.
Ems water, 20.
Emetic mixture, 125.
Enemata, 25, 100.
Enteroptosis, 88.
Epilepsy, 112.
Erythrodextrin, Test for, 11.
Eucasein, 35.
Ewald, 17, 74.
Ewald's test meal, 9, 60.
Examination of fæces, 8, 12.
,, ,, Gaultier on, 14.
,, fasting stomach, 8.
,, kidney, 6.
,, mouth, 4.
,, patient, 1.
,, ,, Physical, 4.
,, ,, Subjective, 2.
,, stomach contents, 8.
Exercise, Necessity for, 27.

F

Faber, Knud, 116.
Fachingen water, 20.
Fæces, Chemical and microscopical examination of, 8, 12.
,, chemical and microscopical examination of, Apparatus required for, 8.
Fæces, Detection of blood in, 13.
,, ,, fats in, 13.
Family history, 4.
Faradic current, 17.
Fasting stomach, Examination of, 8, 62.
Fat, Detection of, in fæces, 13.
Fats in food, 37.
Fehling's solution, 8.
Ferment, milk coagulating, Test for, 11.
,, Salivary, 21.
Ferments, Digestive, 20.
Fenwick, Dr. S., 116.
Ferric chloride reaction, 113.
Fissure of anus, 108.
Flatulence, 91.
Fluids, Importance of, 28.
Flushing of face, 119.
Food, 27.
,, amount required, 39.
Foods, Chemical composition of, 37.
,, Digestibility of, 36.
,, Fuel-value of, 38.
,, Peptonised, 23.
,, Pre-digested, 22.
,, Solubility of, 36.
Foreign bodies in cæcum, 85.
,, ,, œsophagus, 47.
,, ,, stomach, 50.
Formulæ, 123.
Franzensbad, 95.
Free hydrochloric acid, 10, 12, 60, 66, 67, 89.
Fresh air, Necessity of, 27.
Functional diseases of intestine, 87.
,, ,, œsophagus, 48.
,, ,, stomach, 67.
Functions of the stomach, 7.

G

Galvanism, 63, 83, 102.
Gasterine, 22.
Gastralgia, 69.
Gastric crises in locomotor ataxy, 70.
Gastric juice, Excess of, 65, 67.
,, Free hydrochloric acid of, 12.
,, Gauging activity of, 11.
,, Insufficient supply of, and symptoms, 7.
,, Pawlow on, 22.
,, Total acidity of, 12.

Gastritis, 50.
,, Acute and sub-acute, 51.
,, case of Alexis St. Martin, 51.
,, Chronic, 52, 76.
,, ,, Surgical treatment of, 76.
Gastro-intestinal system, 111.
,, -succorrhœa, 65.
Gaultier's test meal, 14.
General mode of life, 26.
Giddiness, 4, 73.
Glycerine enemata, 101.
Glycosuria, 118.
Guaiacum in constipation, 99.
Guensberg's reagent, 8, 10.
Gyromele, Türck's, 16.

H

Harrogate, 96.
Heartburn, 65.
Heat units, Value of various foods in, 38.
Hemmeter, 89, 90.
Herpes iris, 120.
High frequency currents, 17, 63.
History, Family, 4.
,, of case, 2.
Hoff's malt extract, 23.
Homburg, 54, 95, 96.
Hot food or drink, 29.
Hour-glass stomach, 58, 76.
Hydrochloric acid, 9, 10, 12, 21.
Hyperacidity, 65, 67.
Hyperchlorhydria, 65, 76.
Hypersecretion, 65, 67.
Hypnotics, 25.

I

Iced food or drink, 29.
Incubator, 9.
Indican, 119.
Indigestion, Intestinal, 89.
,, Meaning of, 2, 89.
Infants, Feeding of, 27, 33.
Insomnia, 4, 25, 113.
Integumentary system, 119.
Intestinal indigestion, 89.
Intestine, Acute catarrh of, 78.
,, Cancer of, 83.
,, Chronic catarrh of, 80.
Intestine, Functional diseases of, 89.
,, Organic diseases of, 78.
,, Ulceration of, 83.
,, ulceration of, Diphtheritic, 83.
,, ,, Syphilitic, 83.
,, ,, Tubercular, 83.
Intragastric electricity, 18.
,, needle douche, 16.
,, spray, 16.
Introduction, 1.
Iron in foods, 38.

J

Jephson's powder, 99, 125.

K

Kefir, 34, 43
Kidney, Mobile, 6, 62.
Kissingen, 54, 55, 96.
Klemperer, 46.
Koumiss, 34, 43.
Kuessmaul, 14, 113.
Kuhn, 90.

L

Lactic acid in bread, 9.
,, Test for, 10, 11.
Lavage, 14.
Laryngismus stridulus, 116.
Lecithin, 13.
Life, Mode of, influence on digestive organs, 26.
Liqueurs, 31.
Lister, 24.
Litten, 114.
,, on berberine, 23.
Lime salts in food, 38.
,, ,, milk, 33, 118.
Litmus paper, 8.
Liver, 21, 117.
Lugol's solution, 8.

M

Male fern mixture, 104, 125.
Malt sugar, 22.
Marienbad, 95, 96.
Massage, 17, 63, 102.
Mastication, 27, 50.

Mellin's food, 23.
Menthol and belladonna pill, 102, 126.
Mercuric iodide mixture, 45, 125.
Meteorism, 91.
Microscope, 9.
Microscopical examination of stomach contents, 1, 8.
Milk, 33.
,, Asses' 34.
,, Boiled, 33.
,, Goats', 34.
,, Peptonised, 34.
,, -powder, 34.
,, Sterilised, 33.
,, tea, 29, 30.
Mineral salts in food, 37.
,, waters, in constipation, 95.
,, ,, in gastric disorders, 40.
Mortality after operation for stomach cancer, 77.
Motility of stomach, 7.
Mucous colitis, 82.
Muscæ volitantes, 115.

N

Nervous diarrhœa, 102.
,, eructation, 48.
,, system, 111.
,, vomiting, 71.
Neuenahr, 20, 55, 81.
Neuroses of œsophagus, 48.
,, of rectum, 110.
,, of stomach, 67.
Nightmare, 73, 113.
Nocturnal hemiplegia, 112.
Nutrient enemata, 25, 44, 46, 57, 126.

O

Oculo-motor paralysis, 115.
Œsophagismus, 48.
Œsophagus, Cancer of, 42.
,, Dilatations of, 46.
,, Diseases of, 42.
,, Neuroses of, 48.
,, Simple stricture of, 46.
,, Ulceration of, 45.
Olive oil enemata, 101, 102.
,, in cancer of œsophagus, 44.
,, in hyperacidity, 68.
Olive oil in ulcer, 58.
,, mixture, 68, 124.
Operative interference in diseases of the stomach, 74.
Opium, 25.
Orexine, 23.
Organic diseases of the stomach, 50.
Oxaluria, 118.

P

Pain in relation to food, 3, 25.
Palpation, 5.
Pancreatic emulsion, 23.
Pancreatin, 22.
Papain, 22.
Parasites, 103.
,, Ankylostoma, 103.
,, Round worm, 105.
,, Tape worm, 104.
,, Thread worm, 105.
Paroxysmal sweating, 119.
Patient, General condition of, 3.
,, Physical examination of, 4.
,, Subjective ,, ,, 2.
Pawlow on action of alkalies, 20.
,, on bitters, 23.
,, on olive oil, 68.
,, on gastric juice, 22.
Penzoldt on diet, 36.
,, on orexine, 23.
Pepsin, 9, 21.
Peptone, 11.
Peptonised foods, 23.
,, milk, 34.
Peptonuria, 119.
Percussion, 6.
Perigastric adhesions, 58.
Peristalsis, 62.
Peristaltic waves, 5, 62.
Phenolphthalein, 9, 12, 14, 99.
Phosphaturia, 118.
Phosphorus in food, 38.
Phthisical dyspepsia, 67.
Physical condition of food, 40.
Piles, 109.
Plasmon, 35.
Polypi of rectum, 109.
Polyuria, 117.
Powders for distending stomach, 6.
Pre-digested foods, 22.
Pressure diverticula of œsophagus, 47.
Primary dilatation of stomach, 61, 62.

Prolapse of rectum, 109.
Proteid food, 39.
Protene, 35.
Ptyalin, 21.
Pyloric obstruction, 7.
,, stenosis, 58.
Pylorospasm, 71.
Pylorus, Cancer of, 59.

Q

QUANTITY of food, 39, 40.

R

RECTAL catarrh, 107.
,, feeding, 25, 44, 46, 57.
Rectum, Cancer of, 108.
,, Diseases of, 107.
,, Fissure of, 108.
,, Neuroses of, 110.
,, Piles and prolapse of, 109.
,, Polypi of, 109.
,, Simple stricture of, 108.
,, Ulceration of, 107.
Reichmann's disease, 67.
Rennin, 11.
Reynolds, 114.
Respiratory system, 116.
Rhubarb and bismuth mixture, 123.
Richet, 35.
Robin, 19.
Round worms, 105.
Royat, 20.
Rubinat water, 28, 98.
Rumsæus, 17.

S

SACCHARINE, 32.
Salivary ferment, 21.
Savory & Moore's pancreatic emulsion, 23.
Scurvy, Infantile, 33.
Sea sickness, 71.
Secondary dilatation of stomach, 61, 64.
Sedatives, 25.
Seidlitz powders, 98.
Senna, 98.
,, pods, 99.
Sleep, 29.
,, Loss of, in causation of atonic dilatation, 61.
Sleeplessness, 4, 25, 113.
Soda and gentian mixture, 128.
Sodium hypobromite solution, 9.
Solubility of food, 36.
Somatose, 35, 43.
Spasmodic constipation, 101.
Spray, Intragastric, 16.
St. Martin, Case of Alexis, 51.
Starling, 19.
Stasis, 7, 16, 62, 76.
Stenosis of bowel, 87.
,, of œsophagus, 42, 43, 46.
,, of pylorus, 56, 58, 61, 62.
Sterilised milk, 33.
Stomach, Absorption by, 7.
,, Cancer of, 59.
,, ,, Surgical treatment of, 77.
,, Catarrh of, 50.
,, Chemical and microscopical examination of contents, 8.
,, Constitutional diseases of, 65.
,, Determination of size and position of, 6.
,, Dilatation of, 61.
,, Diseases of, 5.
,, ,, Indications for operative interference, 74.
,, Distension of, with CO_2, 6.
,, Examination of fasting, 8.
,, Functional diseases of, 67.
,, Functions of, 7.
,, lavage, 14.
,, Motility of, 7.
,, Organic diseases of, 50.
,, Secretion by, 7.
,, Size and position of, 6.
,, Surgery of, 74.
,, tube, 10, 14.
,, ,, Contra-indications, 16.
,, ,, How to pass, 14.
,, ,, Indications for use, 15.
,, Ulcer of, 55, 75.
,, vertigo, 73, 111.
,, washing, 14.
Stricture of bowel, 87.

Stricture of rectum, 108.
,, Simple, of œsophagus, 42, 43, 46.
,, Spasmodic, of bowel, 87.
,, ,, of œsophagus, 48.
Subacidity, 69.
Sugar, Test for, 11.
Sulphur as laxative, 99.
Surgery of stomach, 74.
Syphilitic ulceration of intestine, 83.
Symptomatic diseases, 111.
,, epilepsy, 112.

T

TAKA-DIASTASE, 21.
Tape worm, 104.
Tea drinking, 29, 31.
,, Use of, by constipated persons, 95.
Teeth, 4, 28, 50.
Tenesmus, 107.
Test meal, Ewald's, 9.
,, for examination of fæces (Gaultier's), 14.
,, Objects of, 9.
Tetany, 64, 112.
Thiosinamine in cicatricial stenoses, 46, 64, 108.
,, injection, 126.
Thirst, 4.
Thread worms, 105.
Thymol in ankylostomiasis, 104.
,, mixture, 125.
Tobacco, 29.
Tongue, 4.
Traction diverticula, 47.
Trousseau on acids, 13.
Tube, Stomach, 14, 15.
Tubercular ulceration of intestine, 83.
Türck's gyromele, 16.
Typhlitis, 84.

U

UEFFELMANN'S reagent, 8.
Ulcer of duodenum, 56, 59, 75.
,, of stomach, 55, 75.
Ulceration of intestine, 83.
,, of œsophagus, 45.
,, of rectum, 107.
Ulcerative colitis, 83.
Ureameter, 9.
Urinary system, 118.
Urticaria, 120.

V

VALS, 20.
Vertigo, 73, 111.
Vichy, 20, 35, 55, 65, 68, 81.
Vision, Disturbances of, in relation to digestive disorders, 115.
Vomit, Chemical examination of, 8.
,, Microscopical ,, 8.
Vomiting, Hysterical, 71.
,, Nervous, 71.

W

WASTING, 3.
Water in food, 37.
Watson, Sir T., 49.
Weight of patient, 3.
Weir-Mitchell treatment, 49, 63, 66, 72, 89, 103.
Whey, 34.
Whisky, 32.
Worry as a cause of atonic dyspepsia, 66.

Z

ZANDER apparatus, 90, 97.

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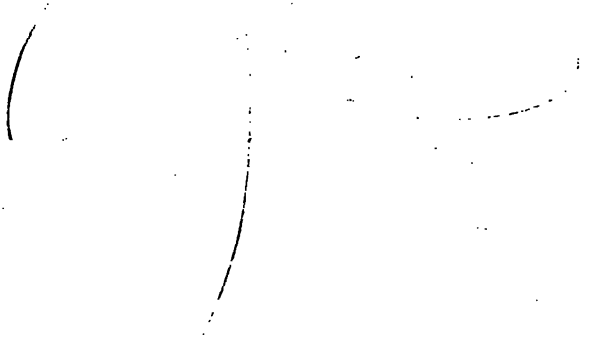

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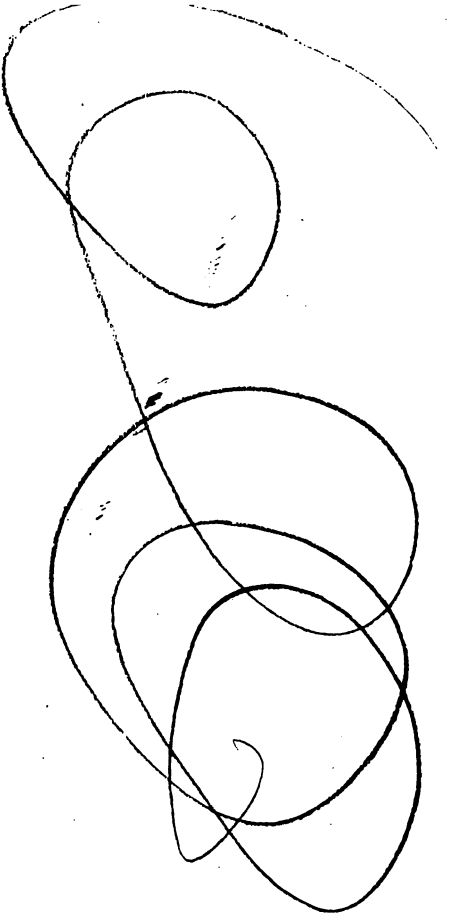
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